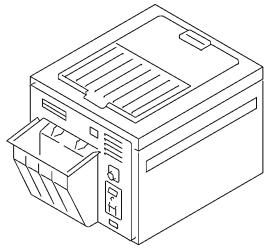
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SERVICE MANUAL
for the
Kodak M35-M and M35A-M *X-Omat* PROCESSORS



H112_0008AC

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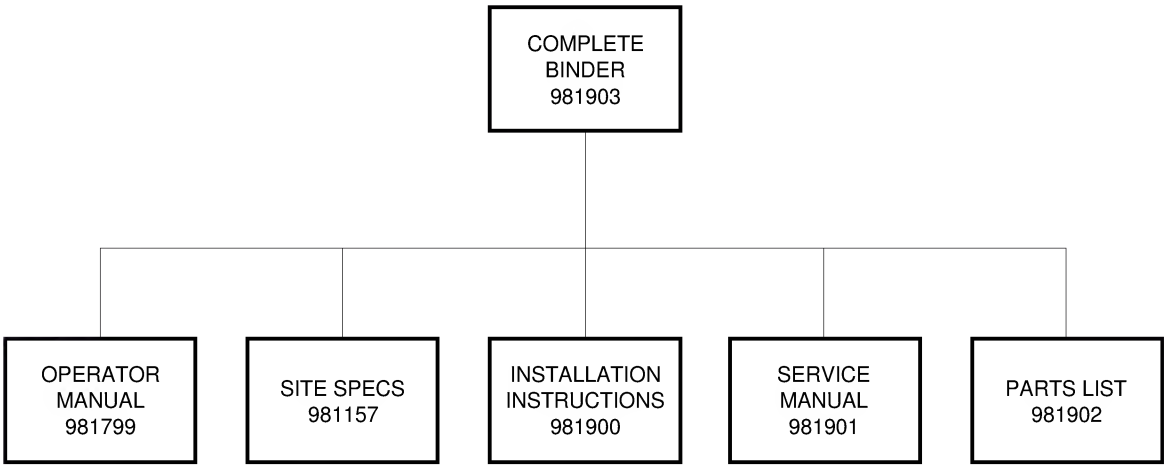
This equipment includes parts and assemblies sensitive to damage from electrostatic discharge. Use caution to prevent damage during all service procedures.

Warning

To avoid hazardous conditions, keep floors and floor coverings around your *Kodak X-Omat* PROCESSOR and associated drains clean and dry at all times. Any accumulation of fluids from mixing tanks, drain lines, etc, should be cleaned up immediately. In the event of an accumulation of liquid due to backup, overflow, or other malfunctions of the drain associated with your *Kodak X-Omat* PROCESSOR, call a plumber or other contractor to correct any problem with the drain. Kodak accepts no responsibility or liability whatsoever for the serviceability of any drain connected to or associated with a *Kodak X-Omat* PROCESSOR. Such drains are the sole responsibility of the customer.

Related Publications for the M35-M and M35A-M PROCESSORS

This publication is part of a series of instruction books that provides technical support information on the *Kodak* M35-M and M35A-M *X-Omat* PROCESSORS. If you need an additional or replacement publication, order it through your Eastman Kodak Representative using the Publication Part Numbers below.



H112_9003BC

Table of Contents

Description	Page
Introduction	1-1
Electrostatic Discharge	1-1
Overview	1-1
Preventive Measures	1-1
Description	1-1
Special Tools Needed	1-1
Specifications and Data	1-1
Film Sizes and Direction of Film Feed	1-2
Speed of the PROCESSOR and Developer Temperature	1-2
Basic Theory of Operation	1-3
Wash Water	1-3
DRYER	1-3
Films and Chemicals	1-3
REPLENISHMENT PUMP	1-3
MAIN DRIVE MOTOR	1-3
BLOWER MOTOR	1-3
Capacity of the TANKS with the RACKS Installed	1-3
Adjustments and Replacements	2-1
FEED SHELF	2-1
Adjustment of the FEED SHELF	2-1
Replacement of the PROTECTIVE MATERIAL	2-1
DETECTOR SWITCHES	2-2
Adjustment of the DETECTOR SWITCHES	2-2
Replacement of the DETECTOR SWITCHES	2-3
CROSSOVER ASSEMBLIES	2-4
Adjustment for Squareness	2-4
RACKS	2-5
Adjustment for Squareness	2-5
Adjustment of the Tension on the DRIVE CHAIN	2-6
Replacement of the DRIVE CHAIN	2-6
Adjustment of the GUIDE SHOES in the DEVELOPER RACK	2-7
Adjustment of the SMOOTH GUIDE SHOES in the DEVELOPER RACK	2-9
Adjustment of a TURNAROUND ASSEMBLY for Squareness	2-11
Replacement of a ROLLER in a TURNAROUND ASSEMBLY	2-12
Replacement of the DRIVE ROLLER in the Developer RACK	2-14
Replacement of the Resilient ROLLERS in the Fixer and Wash RACKS	2-15
Adjustment of the DRYER RACK for Squareness	2-16
Replacement of the DRIVE ROLLER in the DRYER RACK	2-17
Main Drive	2-18
Adjustment of the Main DRIVE CHAIN	2-18
Alignment of the MAIN DRIVE MOTOR	2-19
Replacement of the Main DRIVE SHAFT, WORM GEARS, or BEARING BLOCKS	2-20
Adjustment of the Speed of the MAIN DRIVE MOTOR	2-22
DRYER HEATER	2-24
Adjustment of the Temperature of the DRYER	2-24
Replacement of the BLOWER ASSEMBLY	2-25
Replacement of the DRYER HEATER or the HEATER CORE	2-27
Plumbing	2-29
Adjustment of the Developer Temperature	2-29
Adjustment of the Developer Temperature METER	2-31
Removal of the Developer Temperature METER	2-33
Installation of the Developer Temperature METER	2-34
Replacement of the DEVELOPER HEATER	2-36

Replacement of the DEVELOPER OVER-TEMPERATURE THERMOSTAT . . 2-37
Replacement of the DEVELOPER THERMISTOR 2-38
Replacement of the HEAT EXCHANGERS 2-40
Replacement of the RECIRCULATION PUMP 2-42
Replacement of the O-RING 2-43
Replacement of a REPLENISHMENT PUMP 2-44
Adjustment of the REPLENISHMENT PUMPS 2-45
Adjustment of the Replenishment Flow Rates 2-46
Periodic Maintenance 3-1
General Information 3-1
Roller Transport 3-3
DETECTOR SWITCHES and DETECTOR CROSSOVER ASSEMBLY 3-3
CROSSOVER ASSEMBLIES 3-4
RACK ASSEMBLIES and ROLLERS 3-5
TURNAROUND ASSEMBLIES 3-6
DRIVE CHAIN and SPRINGS 3-7
DRYER 3-8
Main Drive 3-9
Plumbing 3-10
General 3-10
RECIRCULATION PUMPS 3-11
DEVELOPER FILTER and Temperataure 3-12
Chemical Replenishment 3-12
INTERLOCK SWITCH 3-13
Correcting Difficulties 4-1
Diagrams 5-1
Publication History 6-1

Section 1: Introduction

Electrostatic Discharge

Overview

ESD - electrostatic discharge - is a primary source of:

- product downtime
- lost productivity
- costly repairs

While one cannot feel a static charge of less than 3,500 volts, as few as 30 volts can damage or destroy essential components in electronic equipment.

Preventive Measures

- Always look for an ESD warning label before doing any procedure involving static-sensitive components such as CIRCUIT BOARDS. All static-sensitive components are marked with bright graphic labels, which frequently include instructions. Follow all label instructions.
- Wear a grounding strap when handling static-sensitive components. Always make certain that the clip remains attached to a properly grounded, unpainted, clean surface.
- Repair static-sensitive components at an ESD-protected work station or use a portable grounding mat. For help in setting up an ESD-protected work station, contact your Kodak representative.
- When moving static-sensitive components from one area to another, insert and transport the components in ESD-protective packaging. Transparent antistatic bags are available from a variety of manufacturers and will help shield components from ESD damage.

Description

The *Kodak* M35-M and M35A-M *X-Omat* PROCESSORS are designed to process medical x-ray sheet film used for mammography. This self-threading roller-transport processor has a replenishment system, a developer solution filter, recirculation of the developer and fixer solutions, and an automatic standby feature.

Special Tools Needed

The following special tools are necessary for some of the service procedures in this manual.

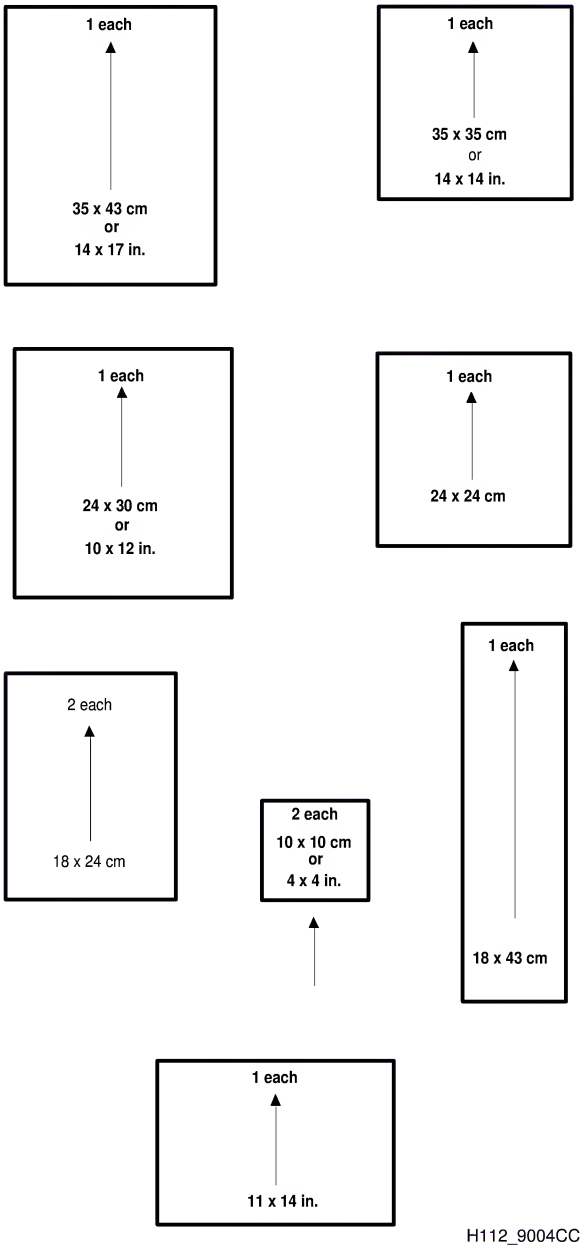
- TL-2244 Motor Oil, 1-oz Tube
- TL-2324 Motor Oil, 12-oz Tube
- TL-1481 Potentiometer Adjusting Tool
- TL-3230 Sealant
- TL-4802 Thermometer
- 1C7639 Turnaround Adjustment Tool

Specifications and Data

Note

Publication No. 981157 contains the site specifications for the *Kodak* M35-M and M35A-M *X-Omat* PROCESSORS.

Film Sizes and Direction of Film Feed



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Caution

- Process only sheet film in the *Kodak* M35-M and M35A-M *X-Omat* PROCESSORS.
- Feeding other than sheet film may result in transport failures and damage to the processing RACKS.

The illustration shows the correct sizes of film to use. Feed mammography film into the PROCESSOR with the emulsion up and in the direction of the arrows. A film feed signal will sound 8 seconds after the trailing edge of the sheet of film leaves the DETECTOR ROLLERS.

Speed of the PROCESSOR and Developer Temperature

Extended Mode: Use this mode for mammography films that the manufacturer has specified are suitable for extended cycle processing. The transport speed for this mode is 50 cm (19½) in.) per minute or 3 minutes and 23 seconds ± 2 sec drop time (dry to dry) for a 24 cm (10 in.) sheet of film. The developer temperature is 35˚C ± 0.3˚C (95.0˚F ± 0.5˚F). The development time is approximately 50 seconds and is based on using *Kodak Min-R* E Film.

Standard Mode: The Standard Mode is suitable for all mammography films. The transport speed for this mode is 76 cm (30 in.) per minute or 2 minutes and 15 seconds ± 2 sec drop time (dry to dry) for a 24 cm (10 in.) sheet of film. The developer temperature is 33.3˚C ± 0.3˚C (92.0˚F ± 0.5˚F). The development time is approximately 33 seconds and is based on using *Kodak Min-R* M Film.

The temperature of the fixer is not adjustable.

Basic Theory of Operation

Wash Water

The water for washing the film comes from the customer's water supply. The FLOW CONTROL VALVE regulates the usage at approximately 1 litre (¼ gallon) per minute.

DRYER

The PROCESSOR has a roller transport dryer with slotted AIR TUBES. A THERMOSTAT controls the temperature from 46 - 65˚C (115 - 150˚F).

Films and Chemicals

The KODAK *M35-M and M35A-M* X-OMAT PROCESSORS accept film that can be processed in *Kodak* RP *X-Omat* Chemicals.

The RECIRCULATION PUMP for the developer and the fixer consists of a thermally protected MOTOR that operates two magnetic, centrifugal pumps.

REPLENISHMENT PUMP

The replenishment system uses a positive displacement BELLOWS PUMP, designed for accurate delivery of replenishment solutions regardless of the solution level in the REPLENISHMENT TANKS.

MAIN DRIVE MOTOR

The MAIN DRIVE MOTOR is an enclosed gearhead motor with an automatic thermal overload protector.

BLOWER MOTOR

The BLOWER MOTOR is equipped with an automatic thermal overload protector.

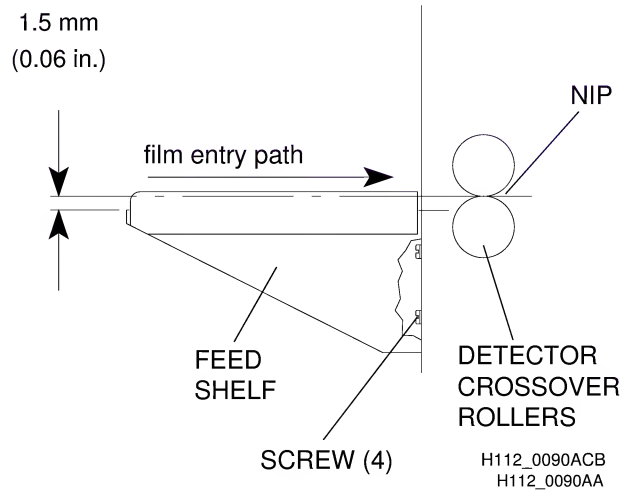
Capacity of the TANKS with the RACKS Installed

The developer, fixer, and wash TANKS each contain 7.8 litres (2.07 gallons).

Section 2: Adjustments and Replacements

FEED SHELF

Adjustment of the FEED SHELF



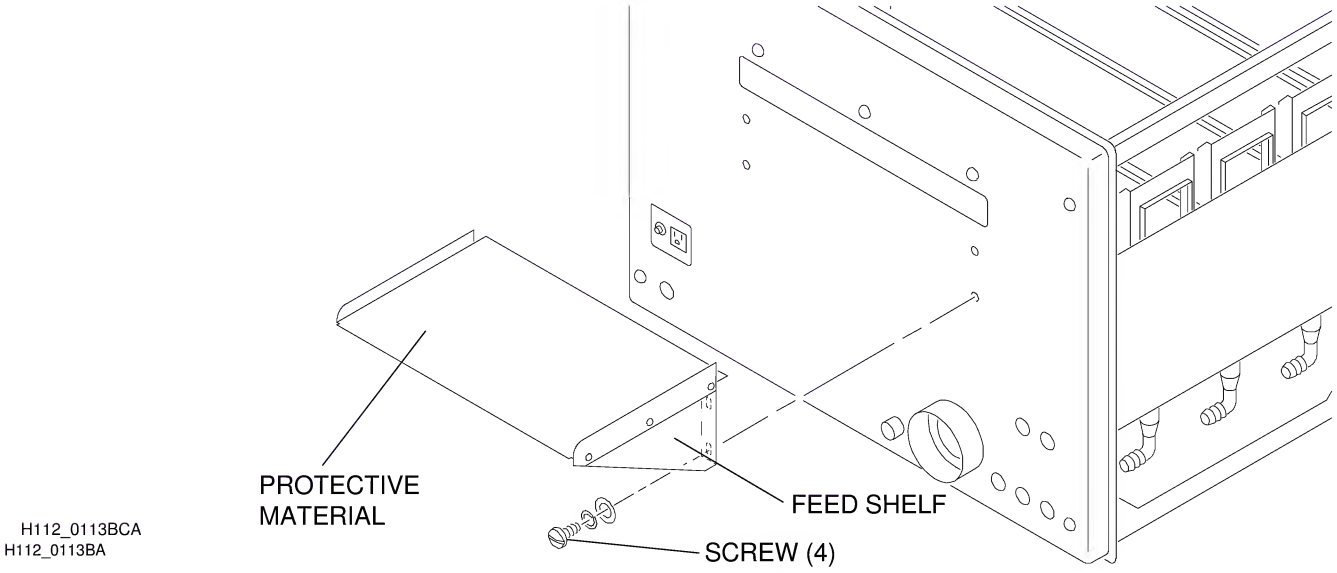
[1] Adjust the height of the FEED SHELF to approximately 1.5 mm (0.06 or 1/16 in.) below the NIP of the DETECTOR CROSSOVER ROLLERS.

- **(a)** Loosen the 4 SCREWS.
- **(b)** Adjust the FEED SHELF for the correct height by moving the FEED SHELF up or down.
- **(c)** Insert a sheet of 35 x 43 cm (14 x17 in.) film into the NIP of the DETECTOR CROSSOVER ROLLERS.

[2] Use the edges of the film to align the FILM SHELF with the DETECTOR CROSSOVER ROLLERS for squareness.

[3] Tighten the 4 SCREWS.

Replacement of the PROTECTIVE MATERIAL



[1] Remove the 4 SCREWS and the FEED SHELF.

[2] Remove all of the existing PROTECTIVE MATERIAL and adhesive from the FEED SHELF.

[3] Clean the FEED SHELF with a damp sponge.

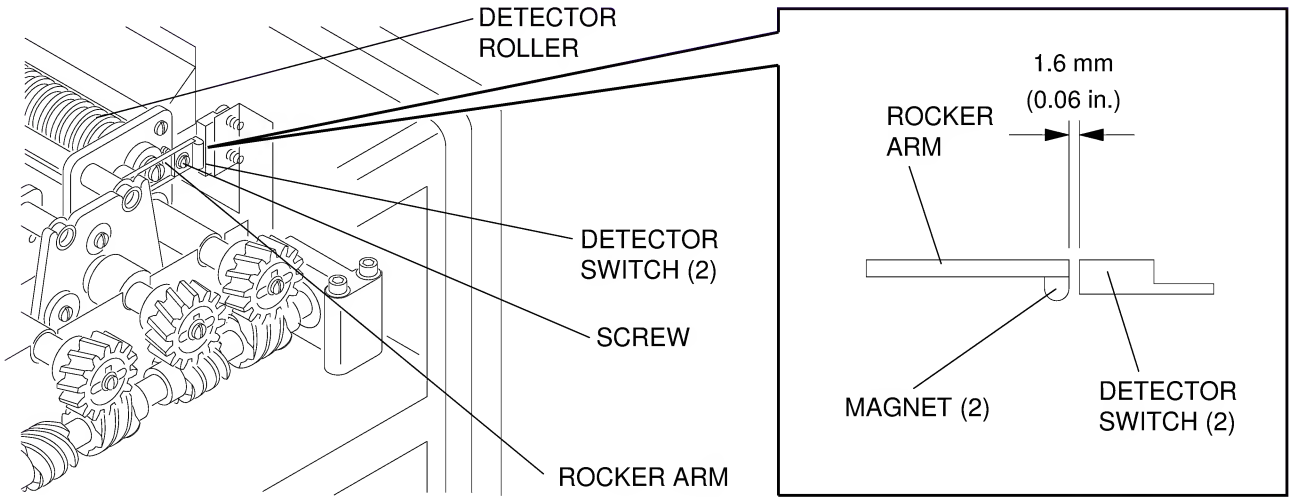
[4] Check that the FEED SHELF is dry before installing the PROTECTIVE MATERIAL.

[5] Install the new PROTECTIVE MATERIAL.

[6] Install the FEED SHELF and adjust if necessary. See the above procedure.

DETECTOR SWITCHES

Adjustment of the DETECTOR SWITCHES



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H112_0112BA

Caution
Moving parts.

[1] Remove the TOP COVER.

[2] Check the DEVELOPER RACK and the DETECTOR CROSSOVER ASSEMBLY for squareness. See Pages 2–4 and 2–5.

[3] Install the DEVELOPER RACK and the DETECTOR CROSSOVER ASSEMBLY.

[4] Set the clearance between the MAGNET and the DETECTOR SWITCH on the drive side to 1.6 mm (0.06 or 1/16 in.).

[5] Check the clearance between the MAGNET and the DETECTOR SWITCH:

- **(a)** Energize the PROCESSOR.
- **(b)** Lift the top DETECTOR ROLLER.
- **(c)** Insert a 5 x 7 in. sheet of film.
- **(d)** Move the drive side DETECTOR SWITCH until the REPLENISHMENT PUMP activates.
- **(e)** Check that the REPLENISHMENT PUMP stops within 3 seconds after you remove the sheet of film.

[6] If necessary, adjust the clearance between the MAGNET and the DETECTOR SWITCH.

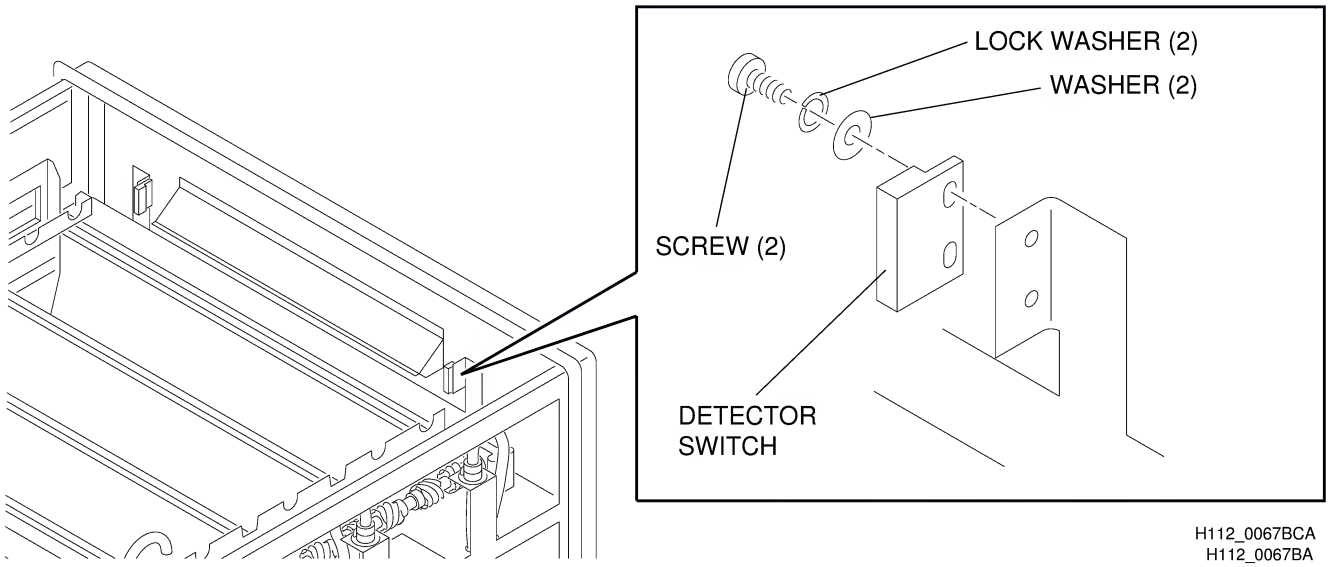
- **(a)** Loosen the SCREW.
- **(b)** Move the ROCKER ARM.
- **(c)** Tighten the SCREW.

[7] Do Steps 4 - 6 to adjust the DETECTOR SWITCH on the nondrive side.

[8] Install the TOP COVER.

[9] Check that the REPLENISHMENT PUMP does not operate unless you feed film.

Replacement of the DETECTOR SWITCHES



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Warning
Dangerous voltage.

[1] Disconnect the main power.

[2] Remove:
- 2 SCREWS
- 2 LOCK WASHERS
- 2 WASHERS
- WIRE TIES, not shown

[3] Disconnect the SWITCH CABLE from the ELECTRICAL BOX.

[4] Connect the new SWITCH CABLE.

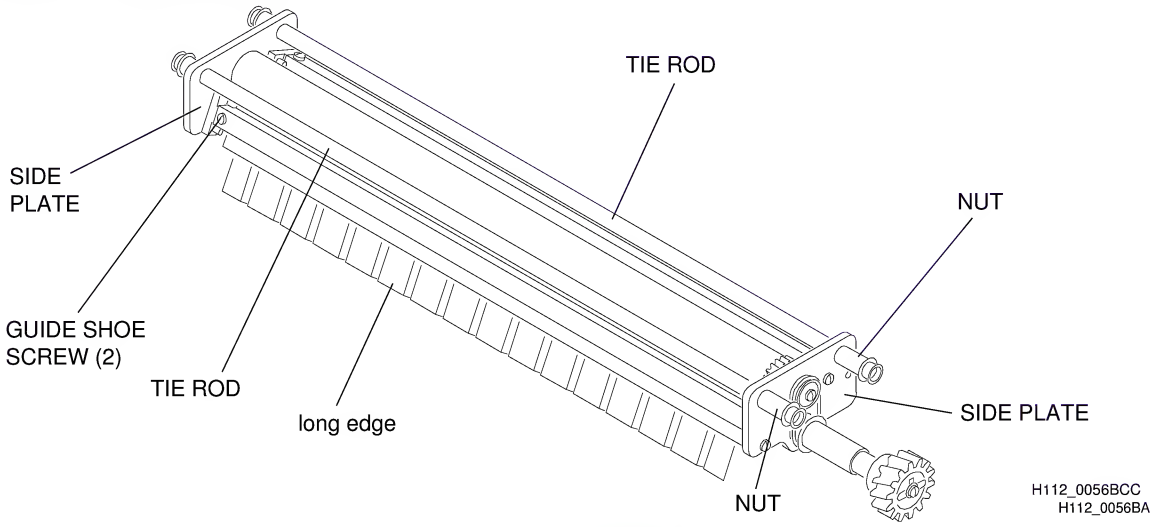
[5] Install:
- new DETECTOR SWITCH
- 2 WASHERS
- 2 LOCK WASHERS
- 2 SCREWS
- new WIRE TIES

[6] Connect the main power.

[7] If necessary, do the adjustment procedure. See Page 2–2.

CROSSOVER ASSEMBLIES

Adjustment for Squareness



Note

Use this procedure to check the squareness of any of the CROSSOVER ASSEMBLIES.

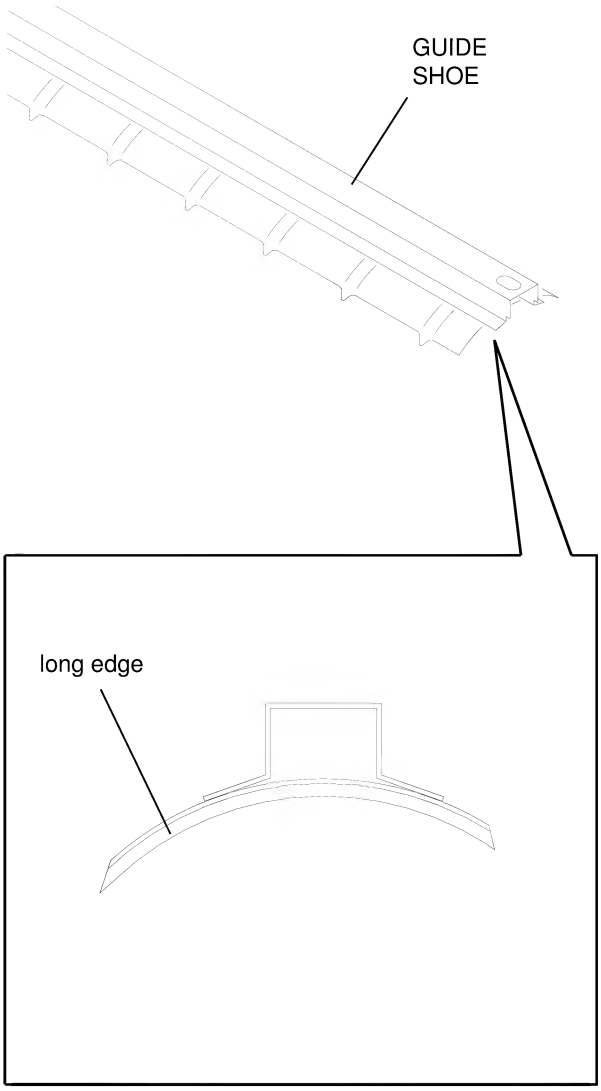
[1] Remove the CROSSOVER ASSEMBLY from the PROCESSOR.

[2] Place the CROSSOVER ASSEMBLY on a smooth, flat surface.

[3] Loosen the 2 NUTS on the 2 TIE RODS.

[4] Check that the 2 SIDE PLATES touch the flat surface evenly.

[5] Tighten the 2 NUTS.



Installation of a New GUIDE SHOE

[6] Remove the existing GUIDE SHOE SCREWS and the GUIDE SHOE.

[7] Install the new GUIDE SHOE, with the long edge in the direction of film travel.

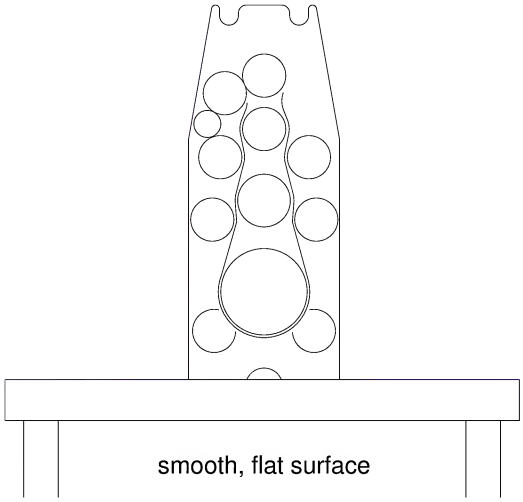
[8] Install the 2 GUIDE SHOE SCREWS.

Note

The GUIDE SHOES have no adjustment procedures.

RACKS

Adjustment for Squareness



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Note

Use this procedure to check the squareness of any of the RACKS.

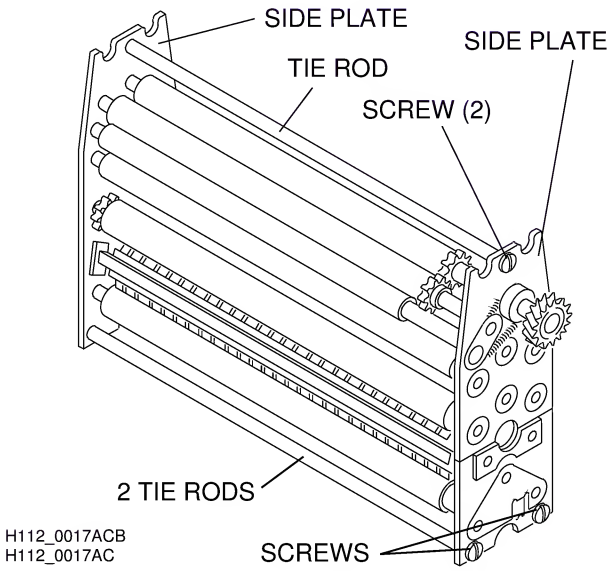
[1] Remove the RACK from the PROCESSOR.

[2] Place the RACK on a smooth, flat surface.

[3] Loosen the SCREWS on the ends of the 3 TIE RODS.

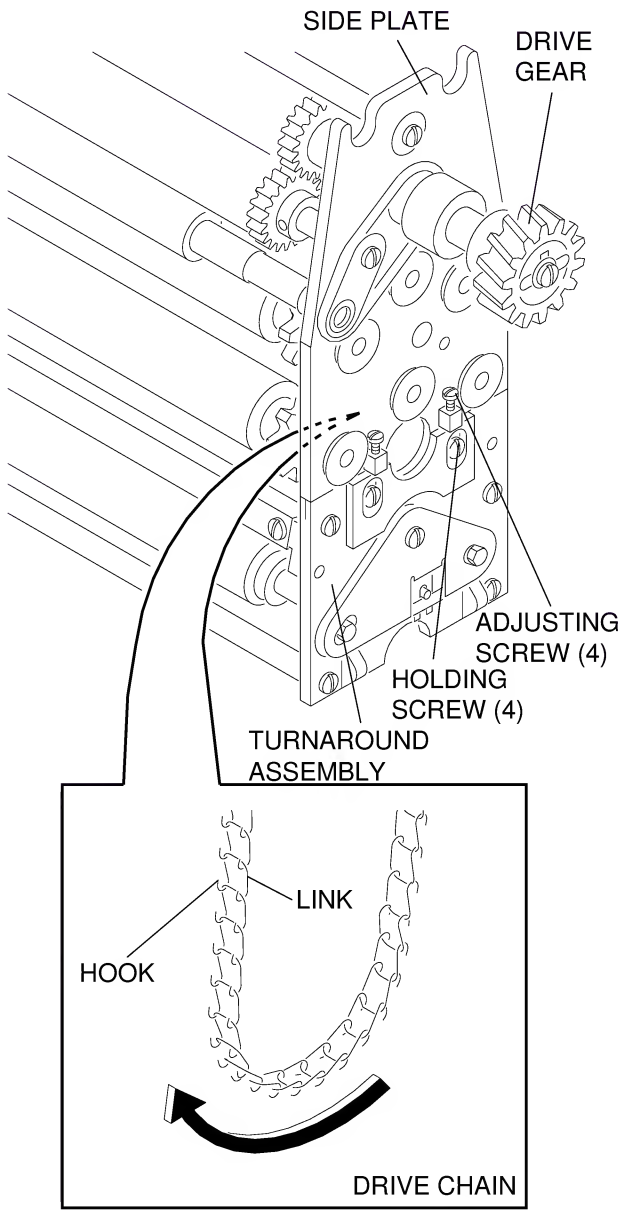
[4] Check that the 2 SIDE PLATES touch the flat surface evenly.

[5] Tighten the SCREWS.



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Adjustment of the Tension on the DRIVE CHAIN



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[1] Check that the DRIVE CHAIN is wet with solution.

[2] To assure that the DRIVE CHAIN is the correct length, check that the RACK is at approximately the same temperature as the solutions in the tanks.

[3] Loosen the 4 HOLDING SCREWS.

[4] Allow gravity to provide full tension on the TURNAROUND ASSEMBLY by holding the RACK above the work surface.

[5] Rotate the DRIVE GEAR one full rotation.

[6] Tighten the 2 HOLDING SCREWS on the drive side first.

[7] Place the RACK on the work surface.

[8] On the drive side of the RACK, tighten the 2 ADJUSTING SCREWS until both SCREWS make contact with the SIDE PLATE of the TURNAROUND ASSEMBLY.

[9] Loosen the 2 HOLDING SCREWS on the drive side.

[10] Rotate the 2 ADJUSTING SCREWS on the drive side counterclockwise one full rotation.

[11] Rotate the DRIVE GEAR one full rotation.

[12] Tighten the 2 HOLDING SCREWS on the drive side.

[13] On the nondrive side of the RACK, rotate the 2 ADJUSTING SCREWS until the distance between the 2 SIDE PLATES on the nondrive side is the same distance as the distance between the 2 SIDE PLATES on the drive side.

[14] Assemble the PROCESSOR and check that it operates correctly.

Replacement of the DRIVE CHAIN

[1] To open the existing DRIVE CHAIN, insert a screwdriver under the HOOKS of a LINK. If necessary, rotate the screwdriver.

[2] Attach the new DRIVE CHAIN to the existing DRIVE CHAIN with the HOOKS in the direction of travel and the openings of the LINKS outward. See the figure above.

[3] Pull the existing DRIVE CHAIN through the RACK until the new DRIVE CHAIN is in the correct position.

[4] Disconnect the existing DRIVE CHAIN from the new DRIVE CHAIN.

[5] Connect the ends of the new DRIVE CHAIN.

[6] Adjust the DRIVE CHAIN. See the procedure above.

Adjustment of the GUIDE SHOES in the DEVELOPER RACK

Important

Do this adjustment only if the customer processes double-emulsion film. The GUIDE SHOES are preset at the factory for a gap of 0.020 in. for single-emulsion film. For a gap of 0.040 in. necessary for double-emulsion film, feed 2 TURNAROUND ADJUSTMENT TOOLS together through the DEVELOPER RACK.

[1] Remove the DEVELOPER RACK from the PROCESSOR.

[2] Do these procedures before you adjust the GUIDE SHOES:

a. Adjust the DEVELOPER RACK for squareness, on Page 2–5

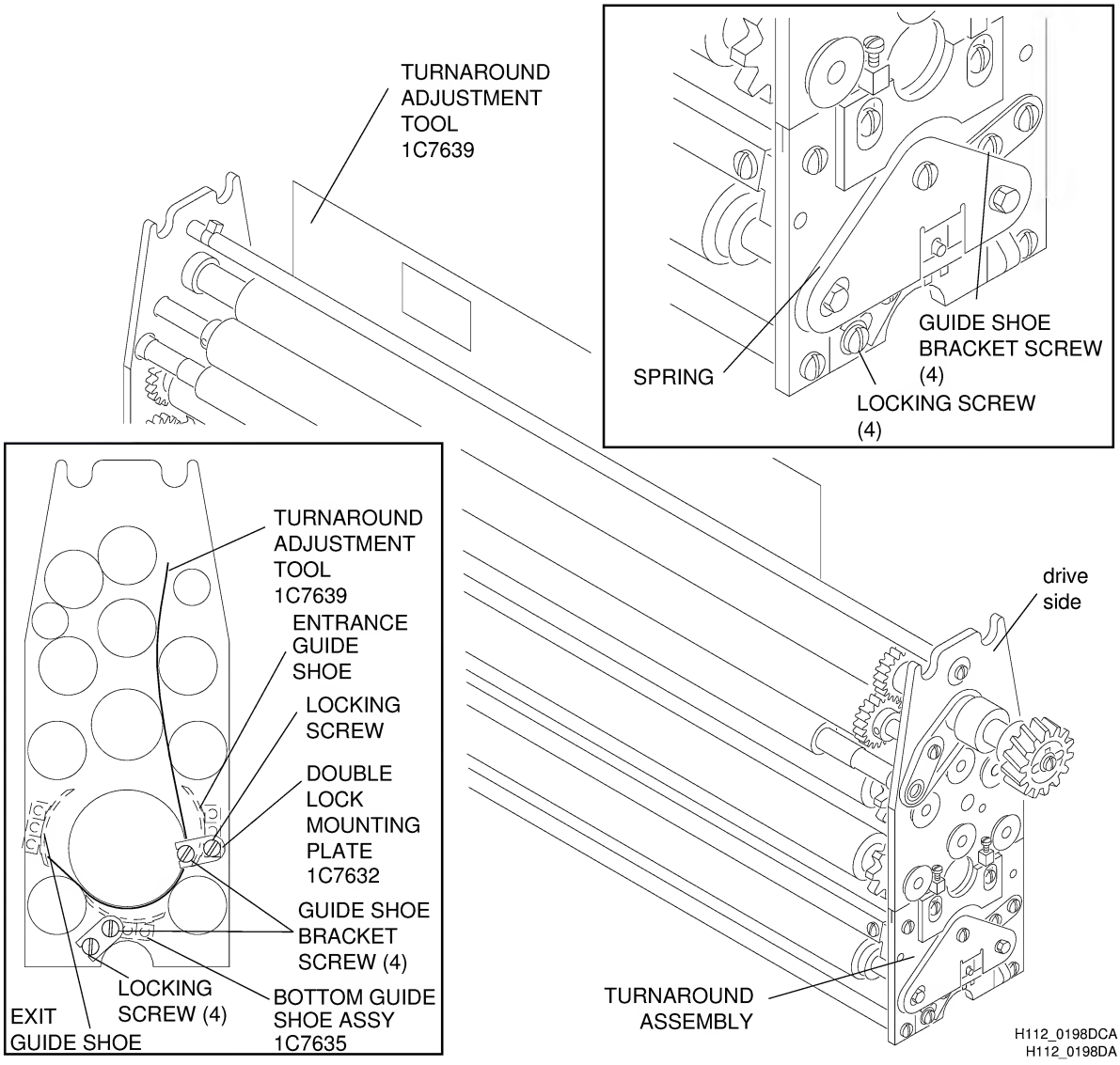
b. Adjust the tension on the DRIVE CHAIN, on Page 2–6

c. Adjust the TURNAROUND ASSEMBLY for squareness, on Page 2–11

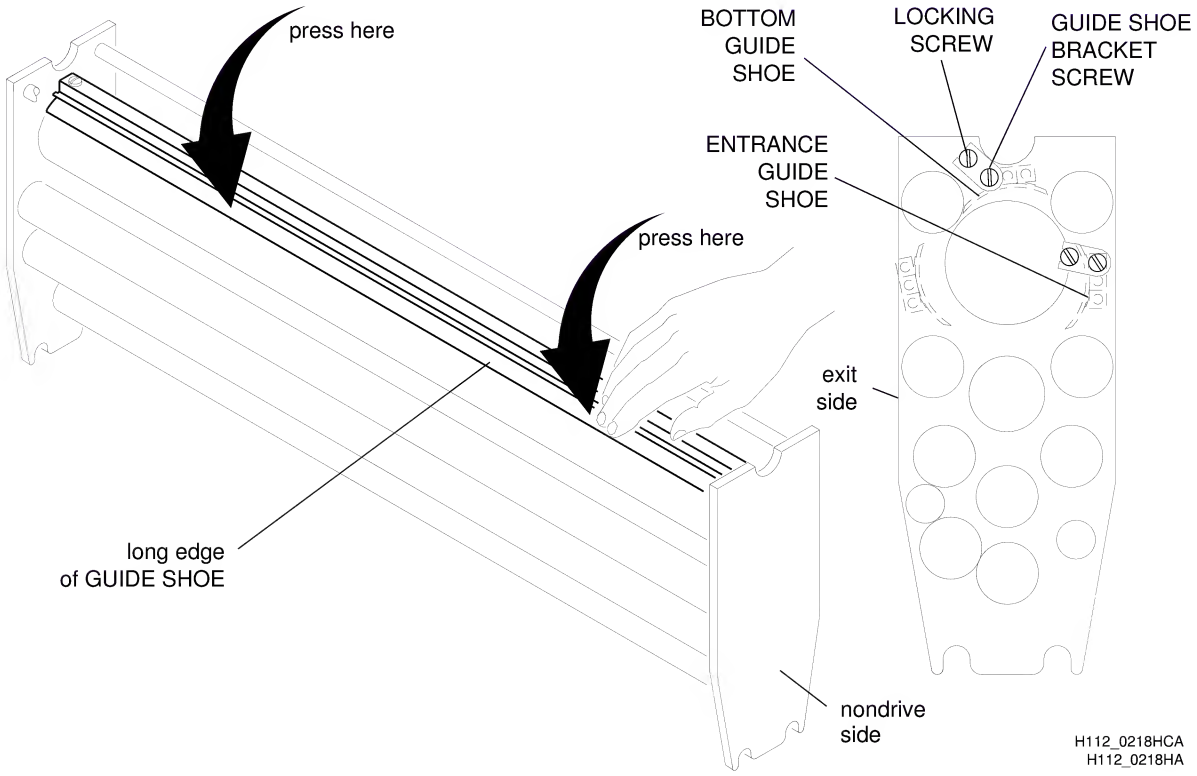
[3] For access to the GUIDE SHOE BRACKET SCREWS, release the SPRING on the drive side of the DEVELOPER RACK.

[4] Loosen the 4 GUIDE SHOE BRACKET SCREWS and the 4 LOCKING SCREWS for the ENTRANCE GUIDE SHOE and the BOTTOM GUIDE SHOE in the TURNAROUND ASSEMBLY.

[5] Feed 2 TURNAROUND ADJUSTMENT TOOLS 1C7639 into the DEVELOPER RACK until the leading edges of the TOOLS are in the EXIT GUIDE SHOE. See the figure below.



Aligning the Edges of the GUIDE SHOES in the DEVELOPER RACK



[6] Place the DEVELOPER RACK with the exit side on the work surface.

[7] Pressing on the long edge of the ENTRANCE GUIDE SHOE approximately 6 cm (3 in.) from the drive side, tighten the drive side GUIDE SHOE BRACKET SCREW.

[8] Press on the nondrive side of the long edge, and tighten the nondrive GUIDE SHOE BRACKET SCREW.

[9] Tighten:

a. drive side LOCKING SCREW

b. nondrive side LOCKING SCREW

[10] Turn the DEVELOPER RACK upside down on the work surface. See the figure above.

[11] Do Steps 7 - 9 for the BOTTOM GUIDE SHOE.

Important

- Do not continue feeding the TURNAROUND ADJUSTMENT TOOL to remove it from the DEVELOPER RACK.
- The EXIT GUIDE SHOE is preset at the factory. Do not adjust.

[12] Reverse the DRIVE GEAR to remove the TURNAROUND ADJUSTMENT TOOL from the DEVELOPER RACK.

[13] Install the SPRING.

[14] Check the DEVELOPER RACK and the TURNAROUND ASSEMBLY for squareness.

[15] Install the DEVELOPER RACK in the PROCESSOR.

[16] Energize the PROCESSOR and check for correct operation.

Note

Adjusting the GUIDE SHOES in the WASH and FIXER RACKS is not necessary.

Adjustment of the SMOOTH GUIDE SHOES in the DEVELOPER RACK

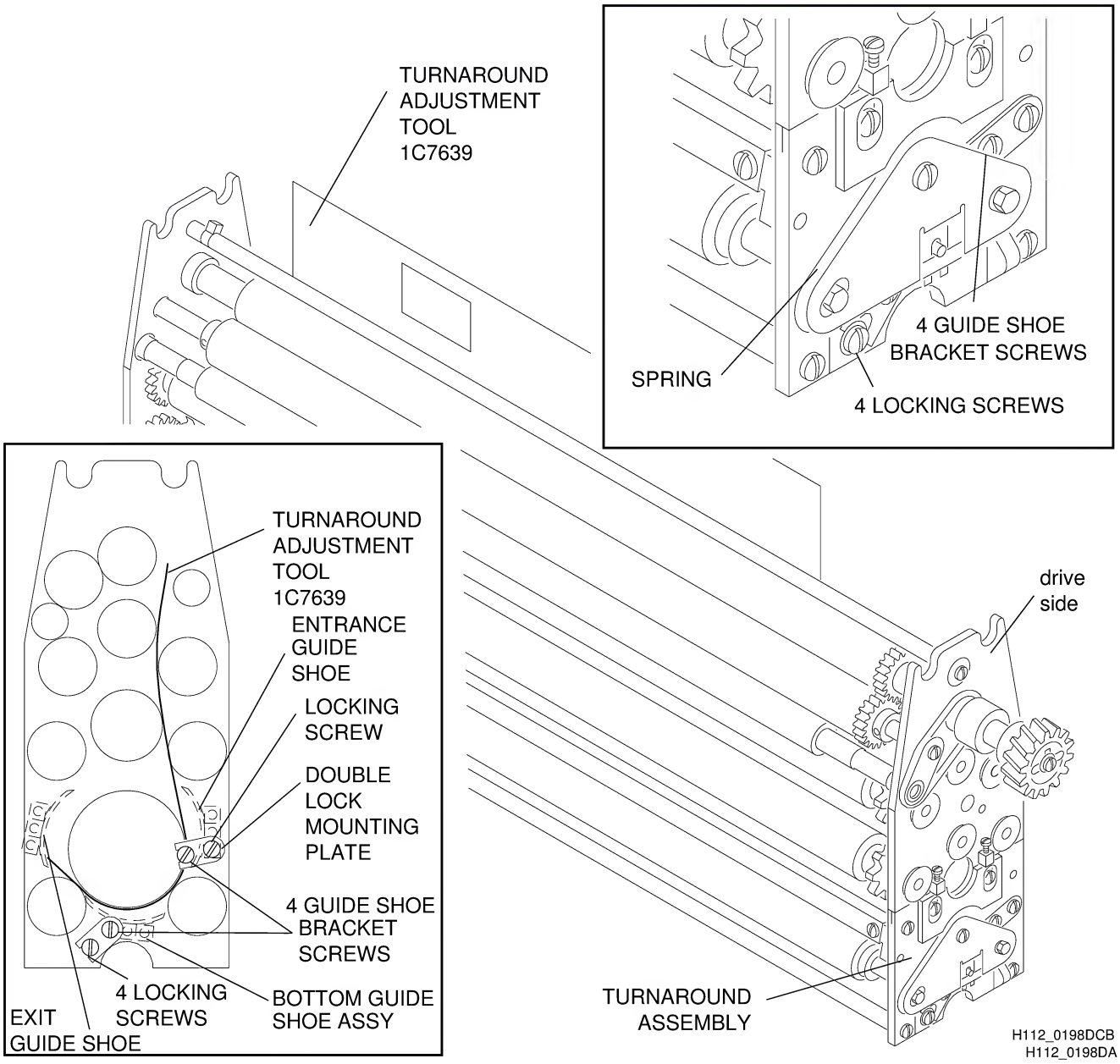
[1] Remove the DEVELOPER RACK from the PROCESSOR.

[2] Do these 3 procedures before you adjust the GUIDE SHOES:

a. Adjust the DEVELOPER RACK for squareness, on Page 2–5

b. Adjust the tension on the DRIVE CHAIN, on Page 2–6

c. Adjust the TURNAROUND ASSEMBLY for squareness, on Page 2–11

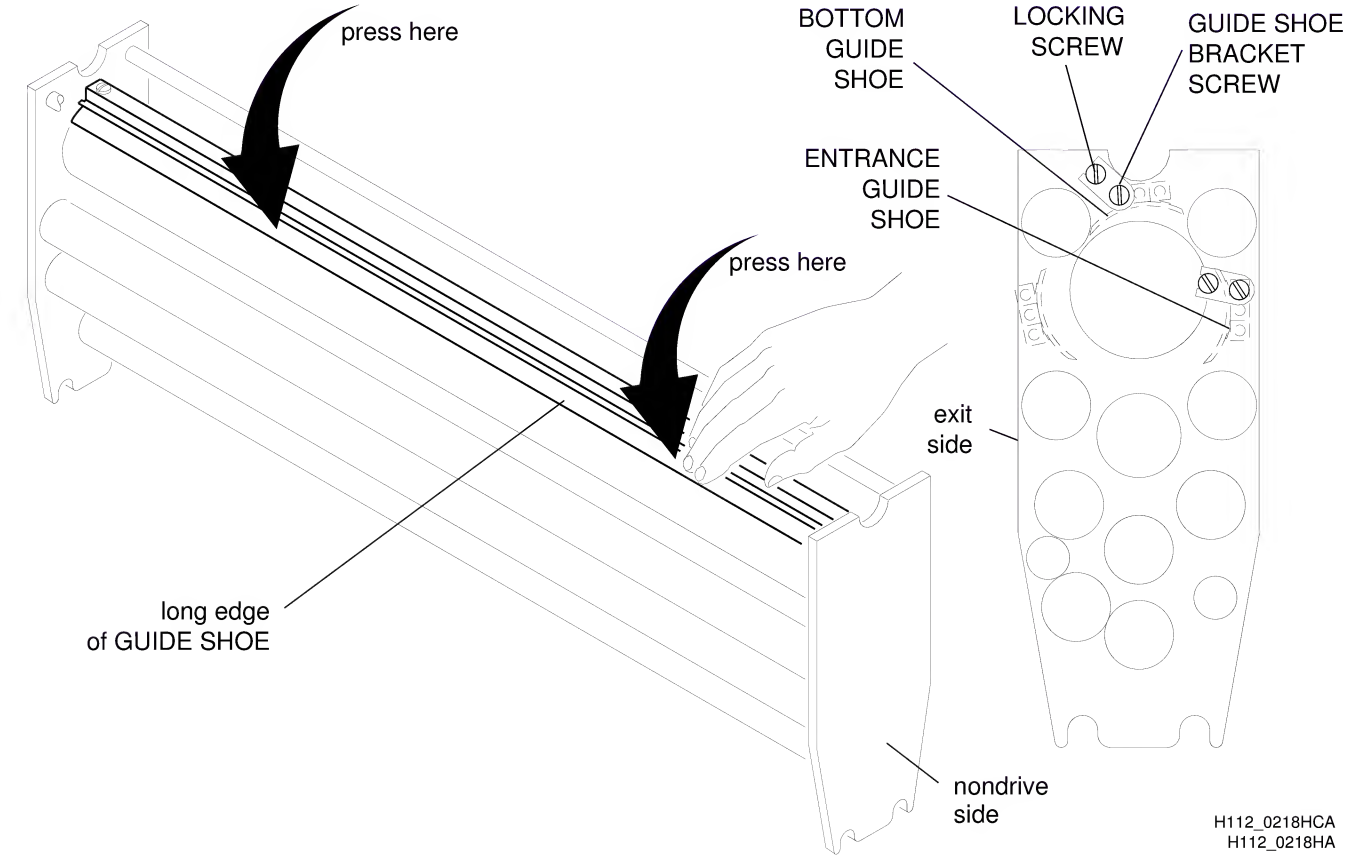


[3] For access to the GUIDE SHOE BRACKET SCREWS, release the SPRING on the drive side of the DEVELOPER RACK.

[4] Loosen the 4 GUIDE SHOE BRACKET SCREWS and the 4 LOCKING SCREWS for the ENTRANCE GUIDE SHOE and the BOTTOM GUIDE SHOE in the TURNAROUND ASSEMBLY.

[5] Feed the TURNAROUND ADJUSTMENT TOOL 1C7639 into the DEVELOPER RACK until the leading edge of the TOOL is in the EXIT GUIDE SHOE. See the figure.

Aligning the Edges of the New GUIDE SHOES



[6] Place the DEVELOPER RACK with the exit side on the work surface.

[7] Pressing on the long edge of the ENTRANCE GUIDE SHOE approximately 6 cm (3 in.) from the drive side, tighten the drive side GUIDE SHOE BRACKET SCREW.

[8] Press on the nondrive side of the long edge, and tighten the nondrive GUIDE SHOE BRACKET SCREW.

[9] Tighten:

a. drive side LOCKING SCREW

b. nondrive side LOCKING SCREW

[10] Turn the DEVELOPER RACK upside down on the work surface. See the figure.

[11] Do Steps 7 - 9 for the BOTTOM GUIDE SHOE.

Important

- Do not continue feeding the TURNAROUND ADJUSTMENT TOOL to remove it from the DEVELOPER RACK.
- The EXIT GUIDE SHOE is preset at the factory. Do not adjust.
- Adjusting the GUIDE SHOES in the WASH and FIXER RACKS is not necessary.

[12] Reverse the DRIVE GEAR to remove the TURNAROUND ADJUSTMENT TOOL from the DEVELOPER RACK.

[13] Install the SPRING.

[14] Install the DEVELOPER RACK in the PROCESSOR.

[15] Energize the PROCESSOR and check for correct operation.

Adjustment of a TURNAROUND ASSEMBLY for Squareness

Note

This procedure is the same for disassembling all the RACKS.

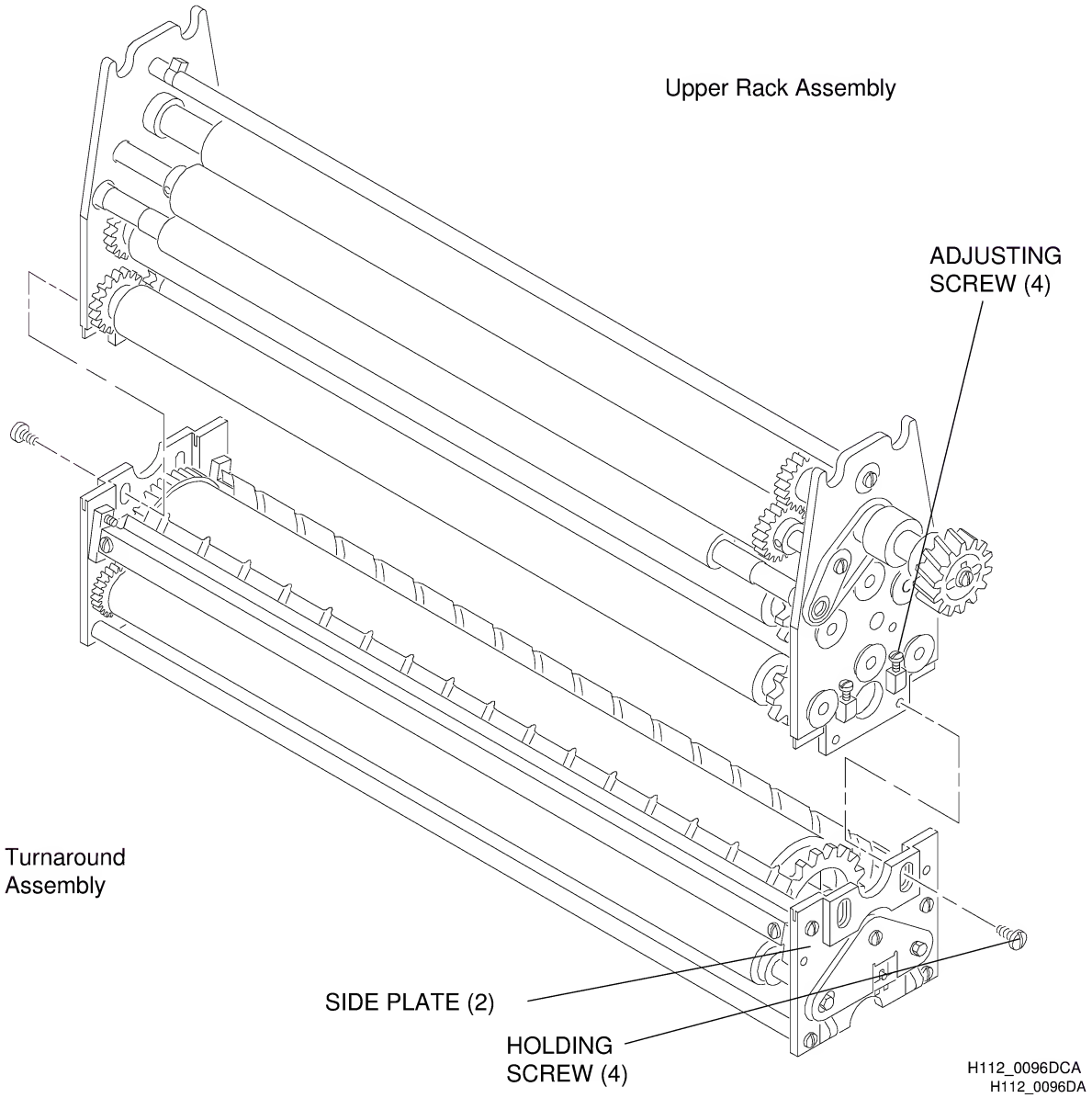
[1] Place the RACK on a smooth, flat surface.

[2] Loosen the 4 HOLDING SCREWS.

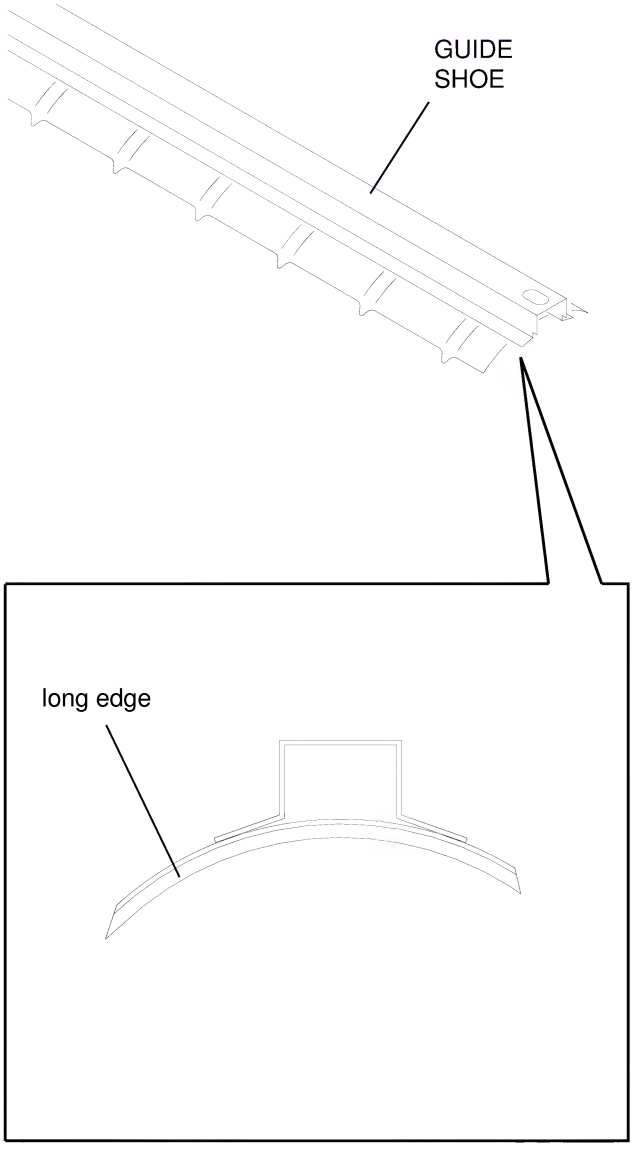
[3] Rotate the 4 ADJUSTING SCREWS the same amounts to move the TURNAROUND ASSEMBLY up or down.

[4] Check that the 2 SIDE PLATES of the TURNAROUND ASSEMBLY touch the flat surface evenly.

[5] Tighten the 4 HOLDING SCREWS.



Replacement of a ROLLER in a TURNAROUND ASSEMBLY



H112_0220CCA
H112_0220CA

Note

See the figure on Page 2–13 for this procedure.

[1] To remove an A ROLLER, remove:

- 2 SPRINGS
- LOCKING PLATE
- SCREW
- A ROLLER from the SHAFT

[2] To install a new A ROLLER, install:

- new A ROLLER on the SHAFT
- A ROLLER in the TURNAROUND ASSEMBLY
- LOCKING PLATE
- 2 SPRINGS

[3] To remove the B ROLLER, remove:

- TURNAROUND ASSEMBLY from the RACK
- 2 SPRINGS
- LOCKING PLATE
- 2 A ROLLER ASSEMBLIES
- 2 SCREWS
- 2 BRACKETS
- EXIT GUIDE SHOE
- SHAFT, THRUST WASHERS, and the BEARING from the B ROLLER

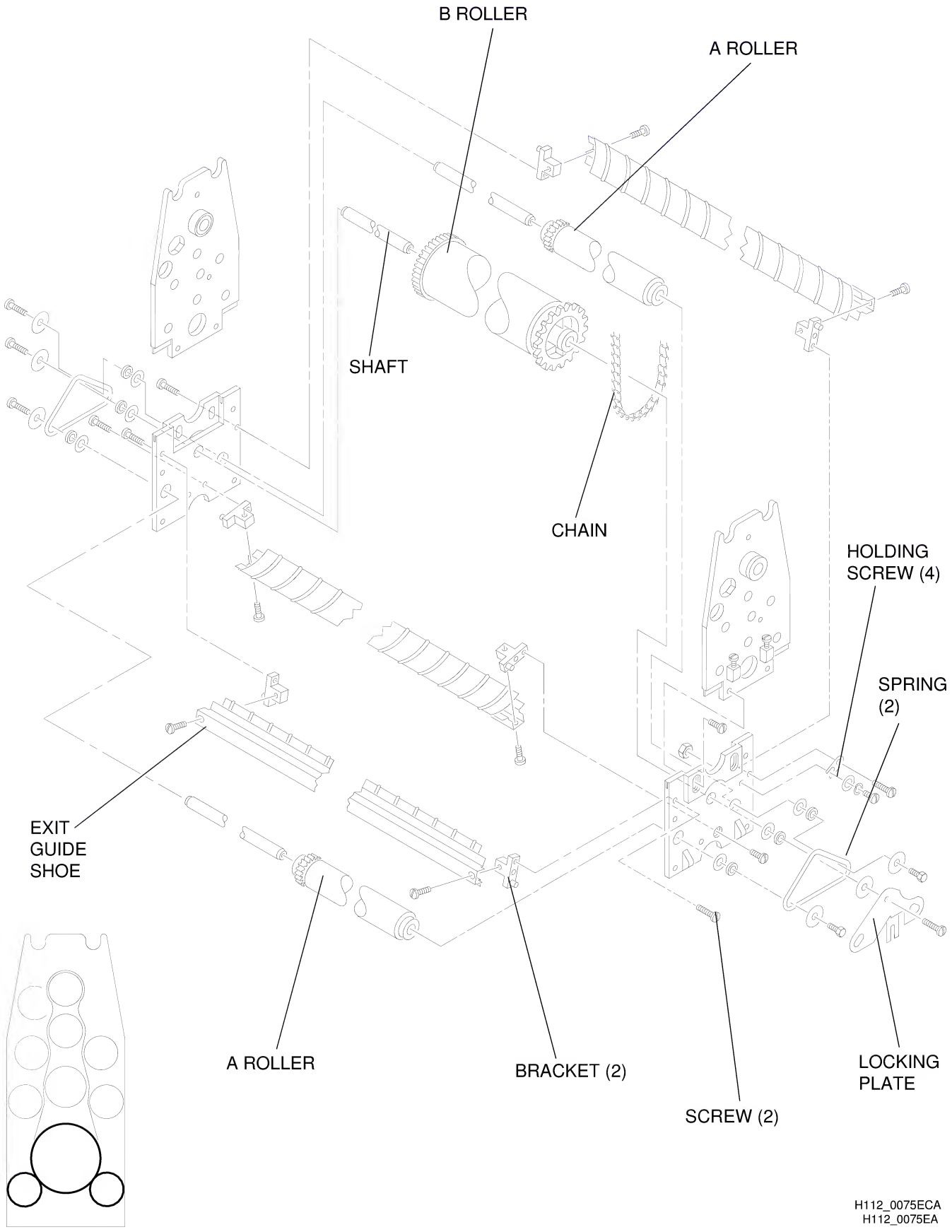
[4] Install the new B ROLLER and the other existing parts.

[5] Check that the DRIVE CHAIN has the correct tension. See Page 2–6 if adjustment of the DRIVE CHAIN is necessary.

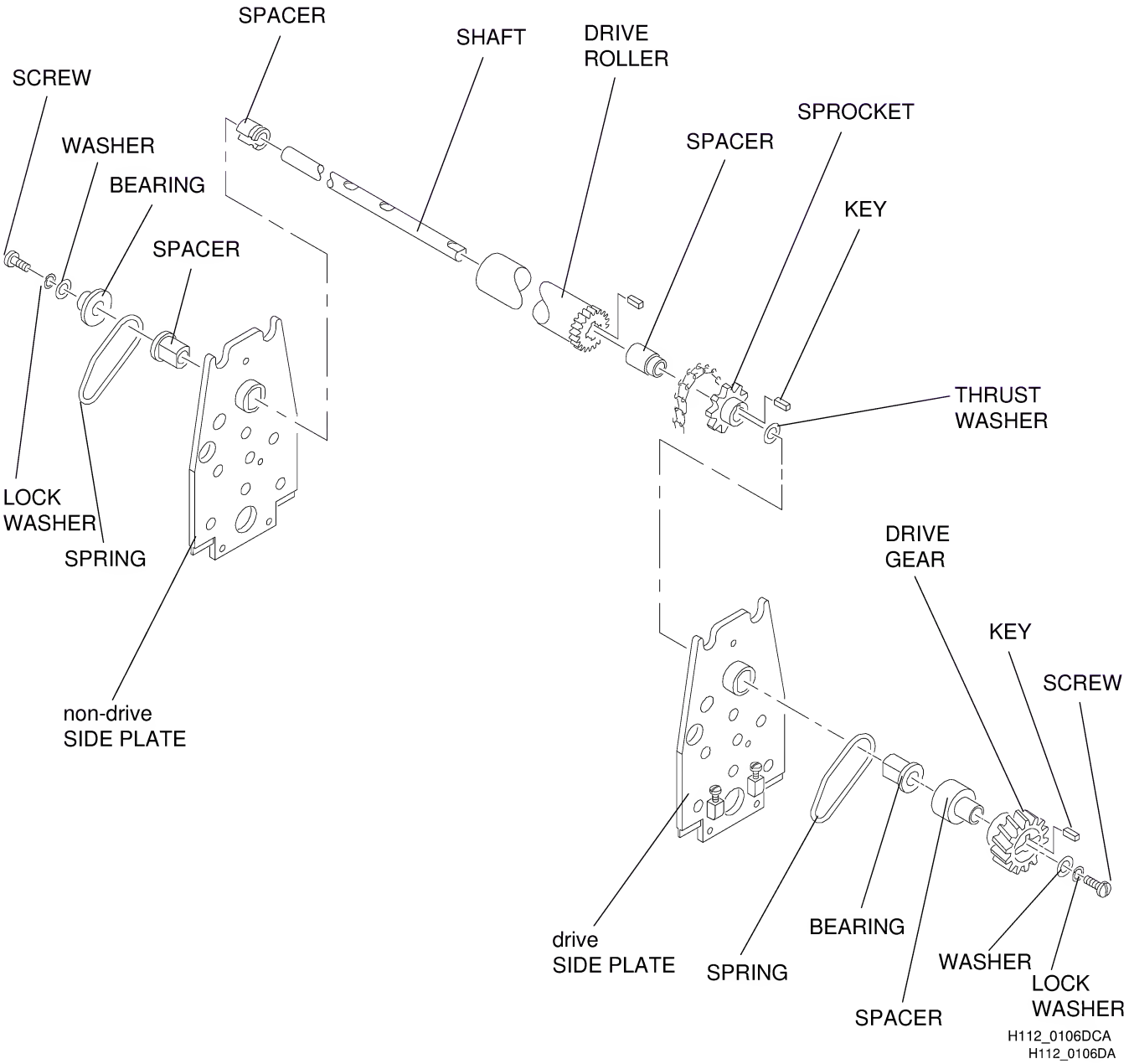
[6] Check that the long edges of the GUIDE SHOES are in the direction of film travel. See the figure at the left.

[7] Check that all GEARS in the TURNAROUND ASSEMBLY engage.

Disassembling a TURNAROUND ASSEMBLY



Replacement of the DRIVE ROLLER in the Developer RACK



[1] Remove the 2 SPRINGS from the top of the RACK.

[2] Remove the SCREWS, WASHERS, LOCK WASHERS, GEAR, SPACERS, and BEARINGS from the DRIVE ROLLER on the outside of both SIDE PLATES.

[3] Rotate the flat part of the SHAFT to the up position.

[4] Move the DRIVE ROLLER to the nondrive side and remove the KEY from the SPROCKET.

[5] Pull the SHAFT to the drive side to remove it from the nondrive SIDE PLATE.

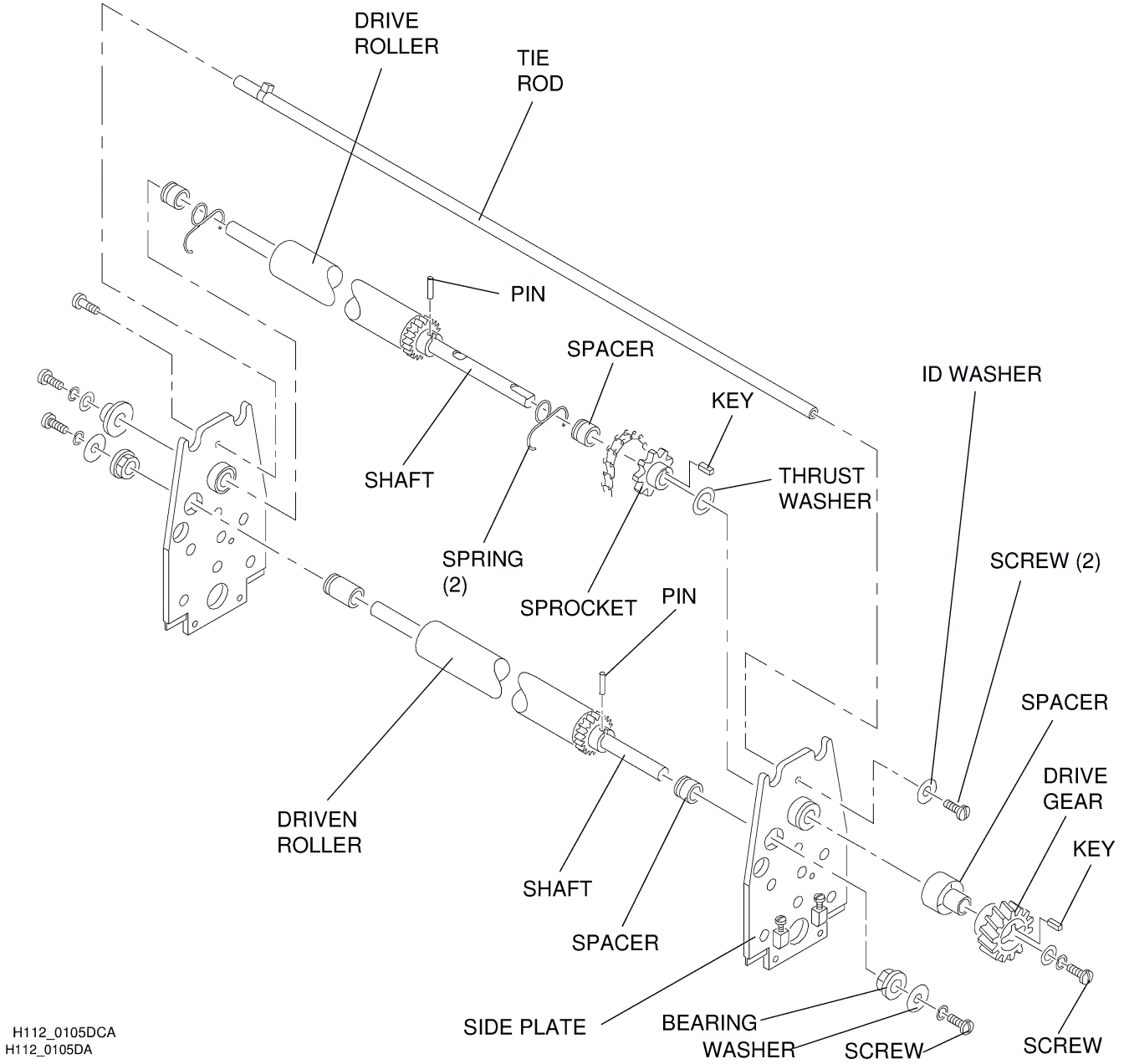
[6] Remove the THRUST WASHER, SPROCKET, and SPACER.

[7] Continue to pull the SHAFT to the nondrive side.

[8] Remove the DRIVE ROLLER.

[9] Reverse the procedure to install the new DRIVE ROLLER.

Replacement of the Resilient ROLLERS in the Fixer and Wash RACKS



[1] Remove:

- 2 SCREWS and the ID WASHER from the TIE ROD
- SCREWS, WASHERS, DRIVE GEAR, SPACERS, and BEARINGS from the DRIVE and DRIVEN ROLLERS on the outside of both SIDE PLATES

[2] Rotate the flat part of the SHAFT of the DRIVE ROLLER to the up position.

[3] Move the DRIVE ROLLER to the nondrive side and remove the KEY from the SPROCKET.

[4] Remove the 2 SPRINGS.

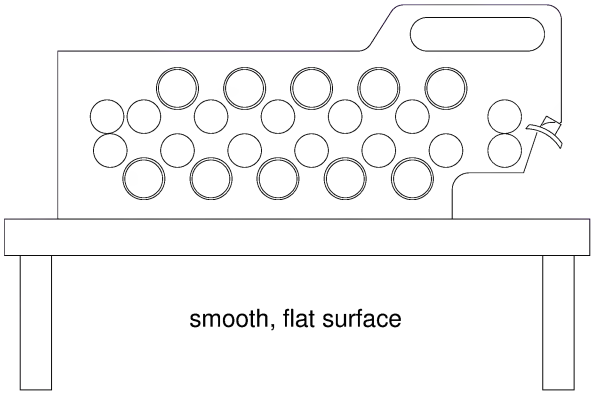
[5] Pull the 2 SHAFTS of the DRIVE ROLLER and the DRIVEN ROLLER to the drive side to remove the SHAFTS from the nondrive SIDE PLATE.

[6] Bend the SIDE PLATE slightly to allow removal of the DRIVE ROLLER.

[7] Remove the THRUST WASHER, SPROCKET, and SPACERS.

[8] Reverse the procedure to install new resilient ROLLERS.

Adjustment of the DRYER RACK for Squareness



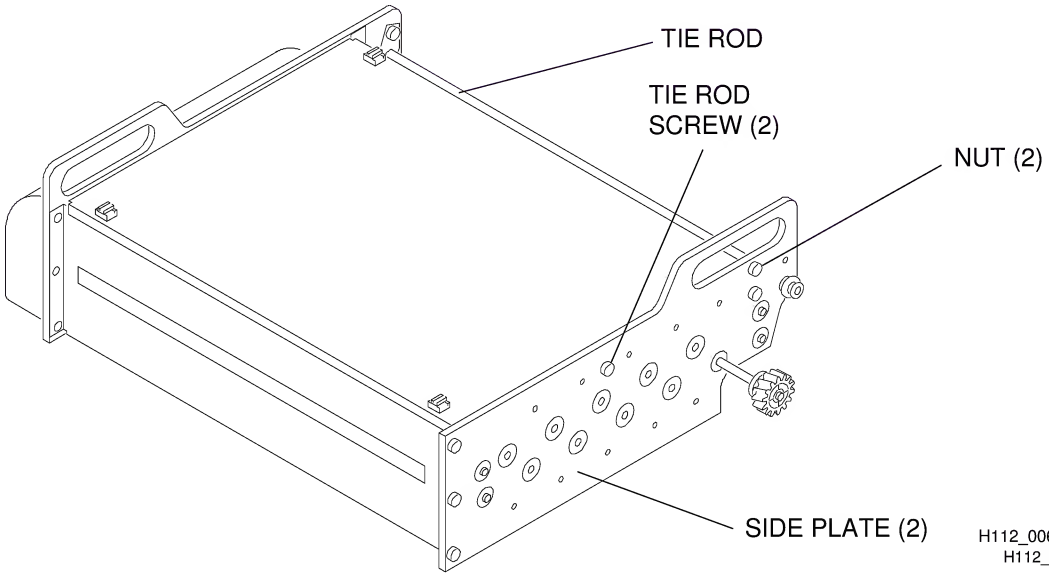
H112_0104AA

[1] Remove the DRYER RACK from the PROCESSOR and place it on a smooth, flat surface.

[2] Loosen the 2 SCREWS and 2 NUTS from the 2 TIE RODS.

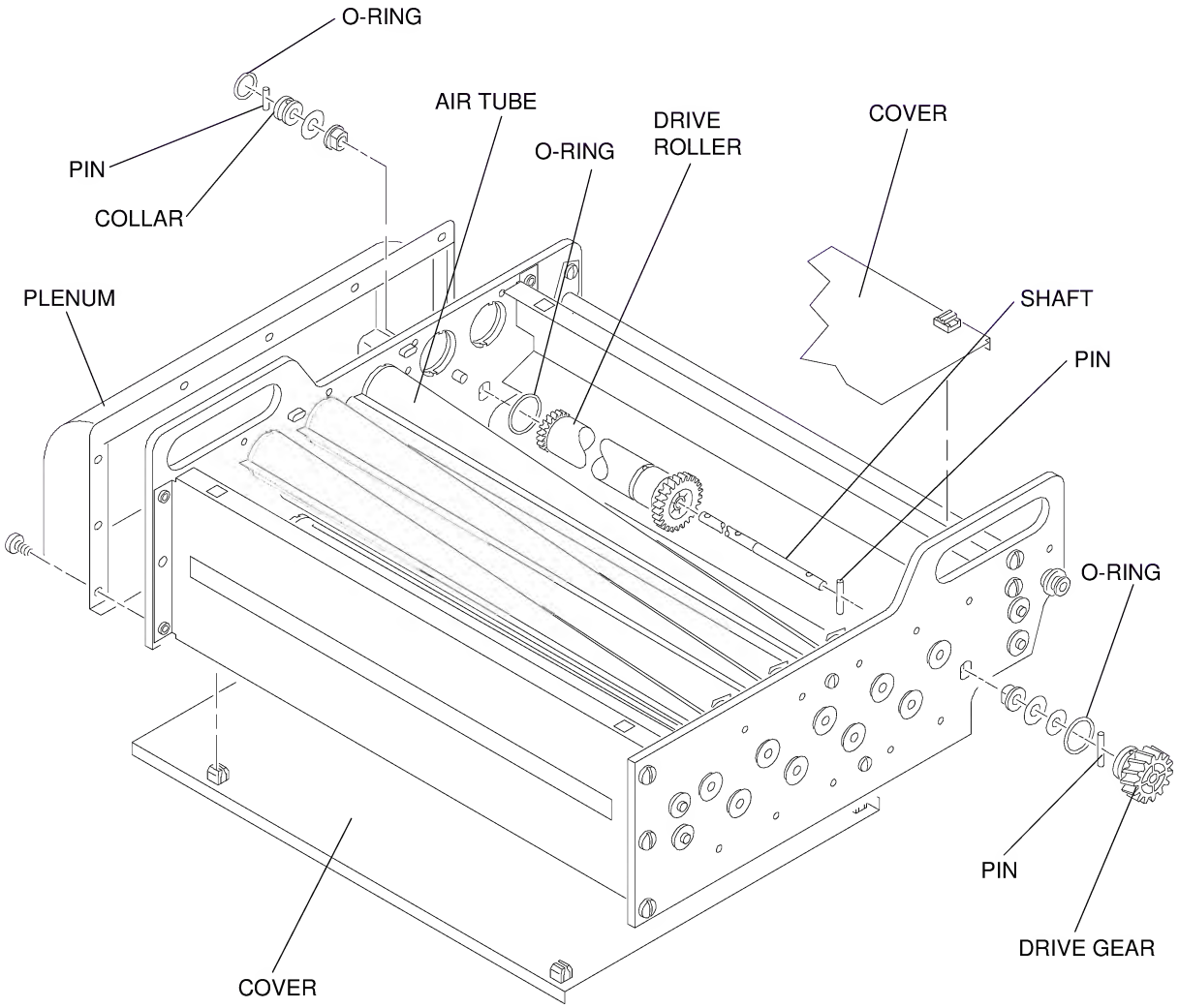
[3] Check that the SIDE PLATES touch the flat surface evenly.

[4] Tighten the 2 SCREWS and 2 NUTS.



H112_0064BCA
H112_0064BA

Replacement of the DRIVE ROLLER in the DRYER RACK



H112_0103DCA
H112_0103DA

[1] Remove:

- top and bottom COVERS from the DRYER RACK
- PLENUM
- first 3 AIR TUBES
- O-RING from the DRIVE GEAR
- PIN
- DRIVE GEAR

[2] On the nondrive side, remove:

- O-RING from the COLLAR
- PIN
- COLLAR

[3] On the drive side, remove the O-RING from the DRIVE ROLLER.

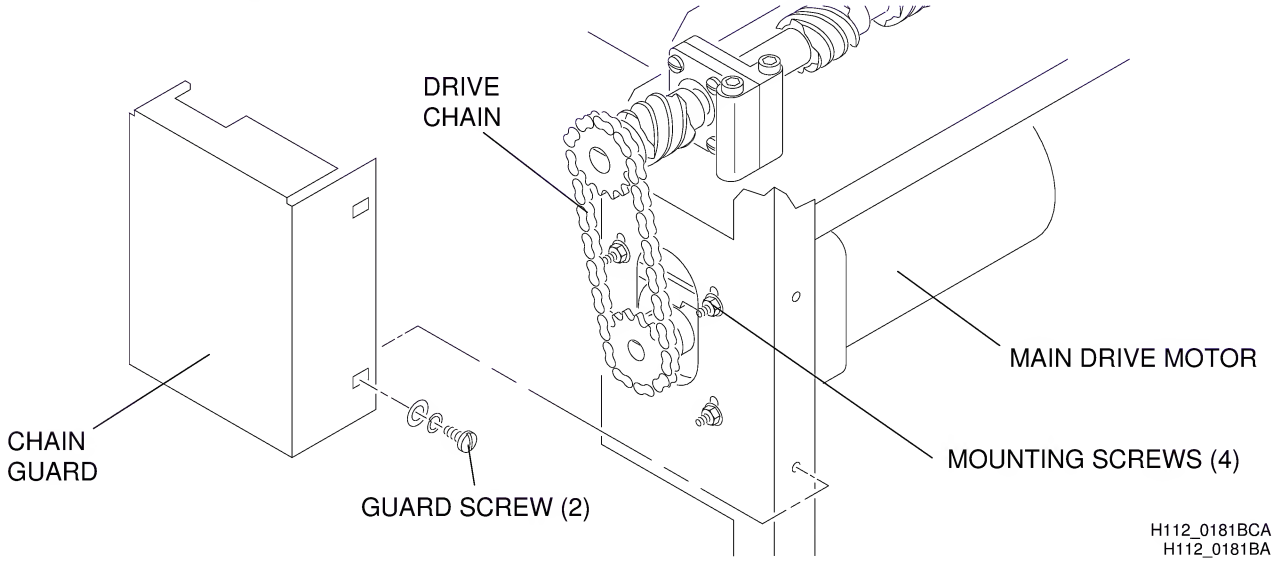
[4] Remove the PIN from the DRIVE ROLLER.

[5] Remove the SHAFT from the DRIVE ROLLER.

[6] Reverse the procedure to install the new DRIVE ROLLER.

Main Drive

Adjustment of the Main DRIVE CHAIN



Warning

Moving parts.

[1] Disconnect the main power.

[2] Remove:

- drive SIDE PANEL
- 2 GUARD SCREWS
- CHAIN GUARD

[3] Loosen the 4 MOUNTING SCREWS.

Caution

Do not overtighten the DRIVE CHAIN.

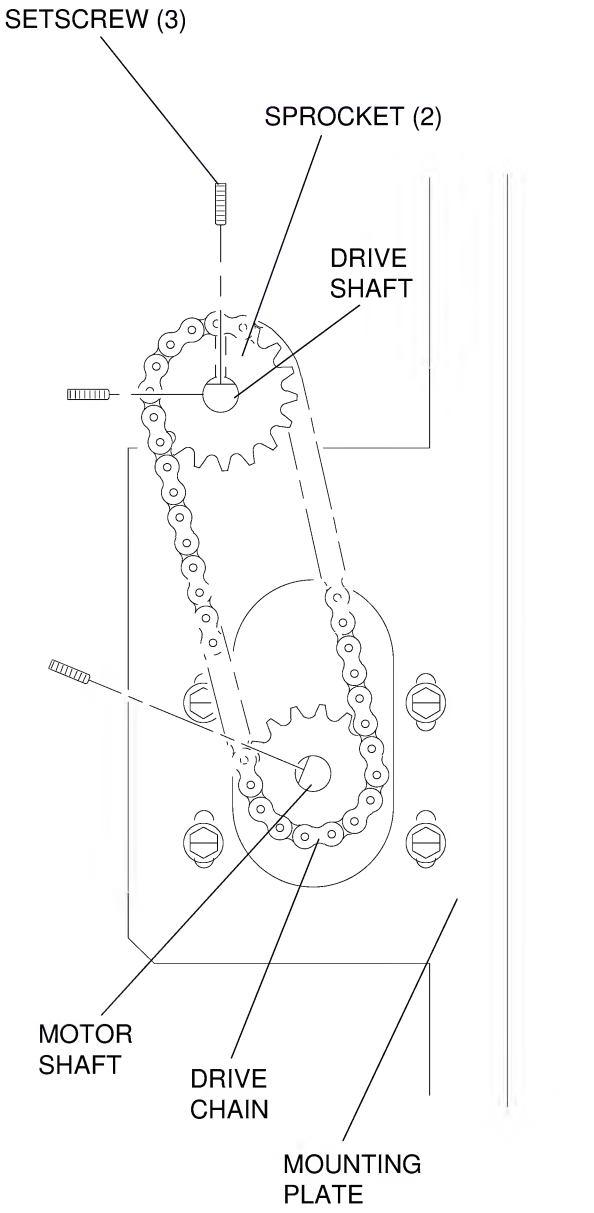
[4] Move the MAIN DRIVE MOTOR up or down until the DRIVE CHAIN is tight. Do not overtighten the DRIVE CHAIN.

[5] Tighten the 4 MOUNTING SCREWS.

[6] Install:

- CHAIN GUARD
- 2 GUARD SCREWS
- SIDE PANEL

Alignment of the MAIN DRIVE MOTOR



H112_0088CCA
H112_0088CC

[1] Remove:
- drive SIDE PANEL
- 2 GUARD SCREWS
- CHAIN GUARD

[2] Loosen the 3 SETSCREWS.

[3] Align the SPROCKETS with the ends of the DRIVE SHAFT and the MOTOR SHAFT.

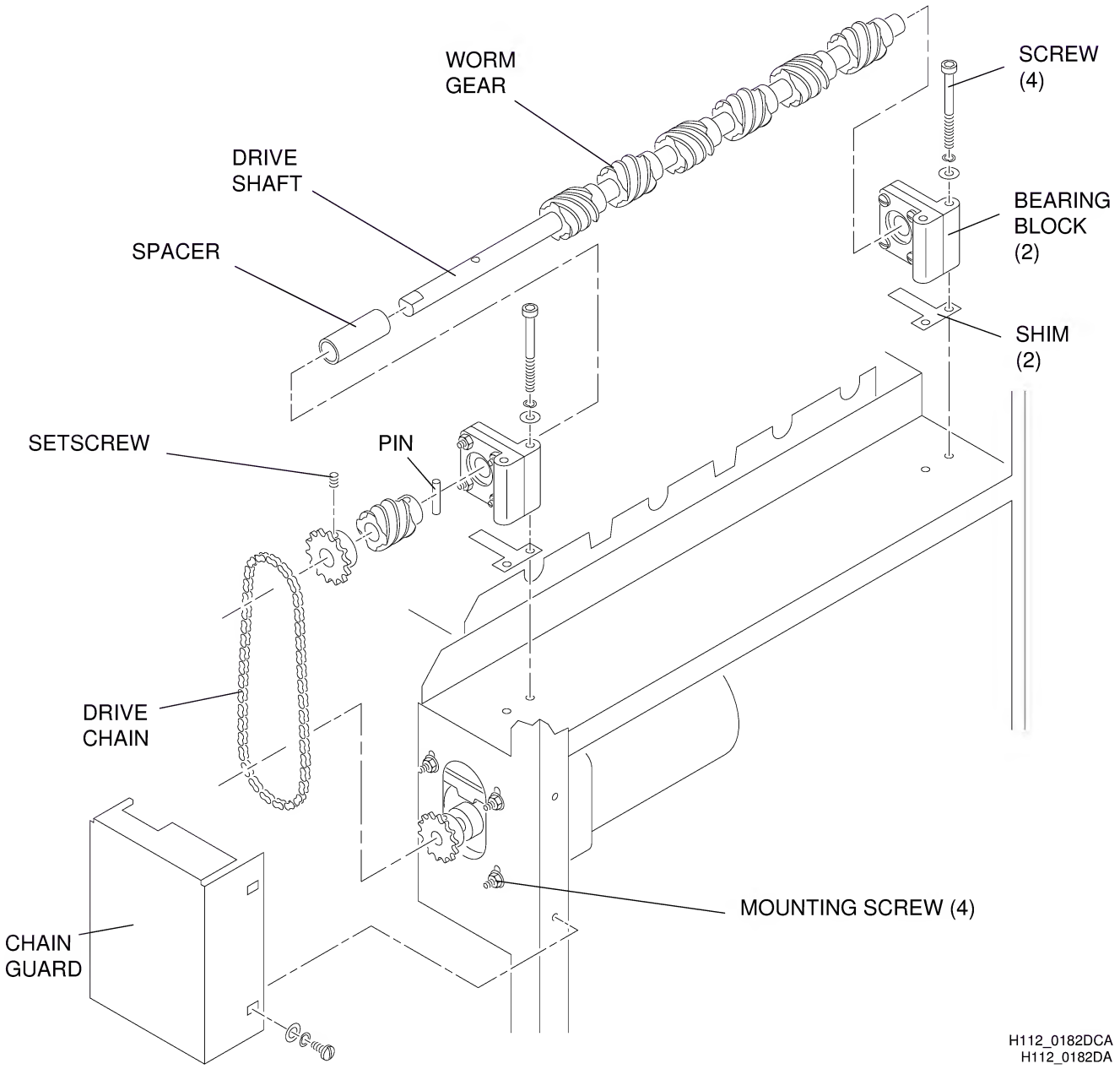
[4] Tighten the 3 SETSCREWS.

[5] Check that the DRIVE CHAIN does not touch the MOUNTING PLATE.

[6] Check that the SPROCKET on the DRIVE SHAFT does not touch the DRIVE GEAR on the DRYER RACK. See the figure on Page 2–17.

[7] Install:
- CHAIN GUARD
- 2 GUARD SCREWS
- SIDE PANEL

Replacement of the Main DRIVE SHAFT, WORM GEARS, or BEARING BLOCKS



[1] Remove the CHAIN GUARD.

[2] Loosen the 4 MOUNTING SCREWS.

[3] Remove:

- DRIVE CHAIN
- 4 SCREWS from the 2 BEARING BLOCKS
- DRIVE SHAFT ASSEMBLY from the PROCESSOR

[4] If the PROCESSOR has SHIMS under the BEARING BLOCKS, save the SHIMS.

[5] Align the SHIMS with the holes for the SCREWS.

[6] Install:

- if necessary, new WORM GEARS or BEARING BLOCKS
- DRIVE SHAFT ASSEMBLY

Caution

Do not overtighten the 4 SCREWS.

[7] Install the 4 SCREWS in the BEARING BLOCKS.

[8] Adjust the position of the BEARING BLOCKS until the DRIVE SHAFT moves freely.

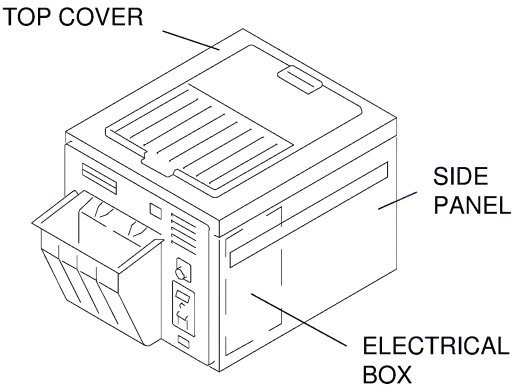
[9] Install the DRIVE CHAIN.

[10] Adjust the DRIVE CHAIN. See Page 2–6.

[11] Tighten the 4 MOUNTING SCREWS.

[12] Install the CHAIN GUARD.

Adjustment of the Speed of the MAIN DRIVE MOTOR



H112_0042ACB
H112_0042AC

[1] Determine the speed of the MAIN DRIVE MOTOR.

(a) Process sheets of 24 cm (10 in.) film in Extended and Standard Modes.

(b) Record the processing times. The correct time for a 24 cm (10 in.) film is:

Extended: 3 minutes and 23 seconds, ±2 sec

Standard: 2 minutes and 15 seconds, ±2 sec

ESD
Possible damage from electrostatic discharge.

[2] If the dry to dry processing times are not correct, adjust the speed of the MAIN DRIVE MOTOR.

(a) Remove the TOP COVER and the drive SIDE PANEL from the PROCESSOR.

(b) Open the ELECTRICAL BOX.

(c) Measure 24 cm (10 in.) on several new sheets of film.

(d) Set the STD/EXT SWITCH to “STD”.

(e) Feed half of the sheets of film into the PROCESSOR. Measure the time for each 24 cm (10 in.) of film to enter the PROCESSOR. The correct time is:

Standard: 20 seconds

(f) Set the STD/EXT SWITCH to “EXT”.

(g) Feed the other sheets of film into the PROCESSOR. Measure the time for each 24 cm (10 in.) of film to enter the PROCESSOR. The correct time is:

Extended: 31 seconds

(h) If the transport time is not correct, adjust R201 for the Extended Mode or R202 for the Standard Mode on 200 CIRCUIT BOARD. See the figure on the next page.

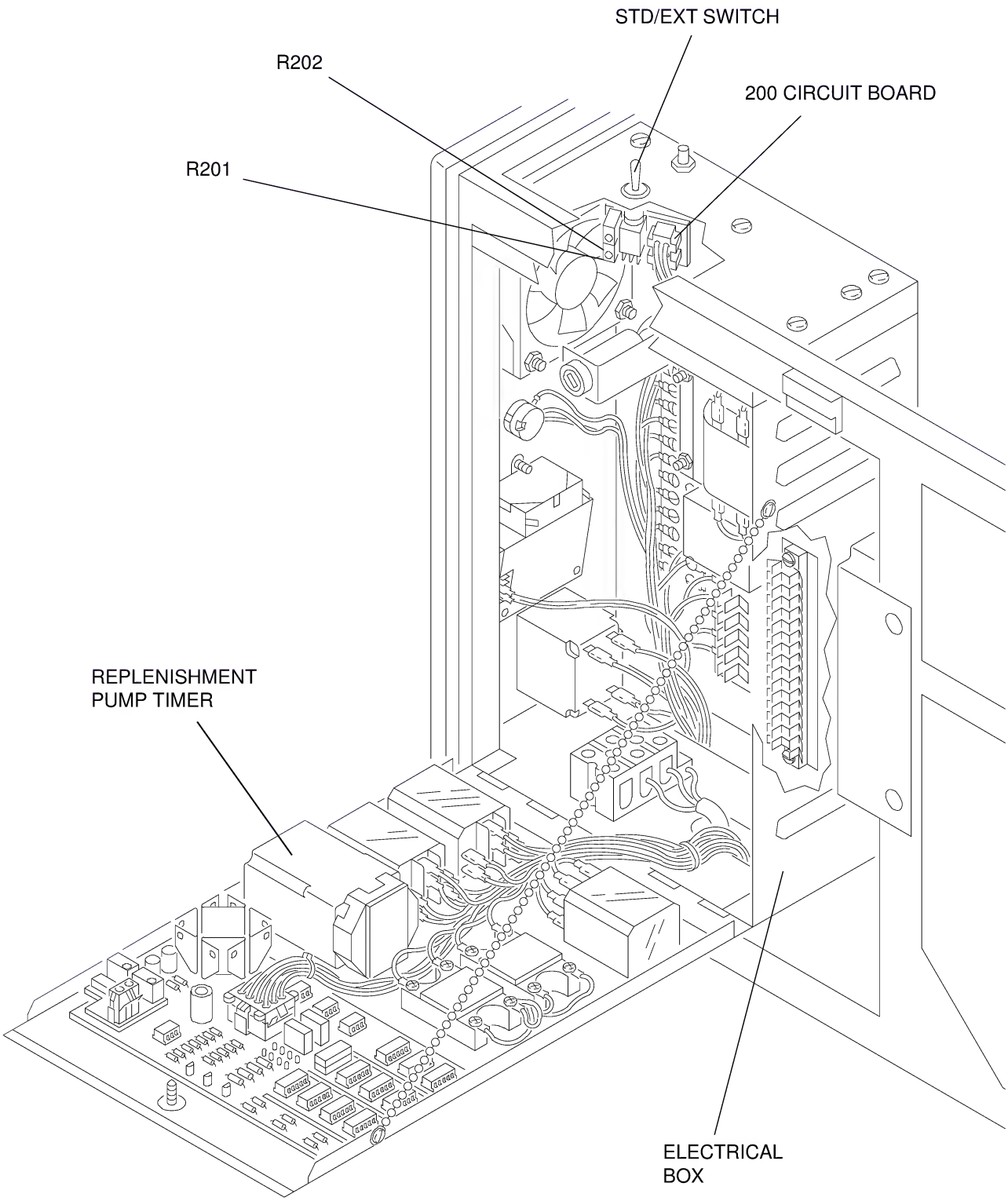
Important
It is important to check the speed of both modes, especially if an adjustment is necessary for one mode.

(i) Do Steps (a) - (h) again to check the processing times. Continue the procedure until the processing times are correct.

(j) Close the ELECTRICAL BOX.

[3] Install the SIDE PANEL and the TOP COVER.

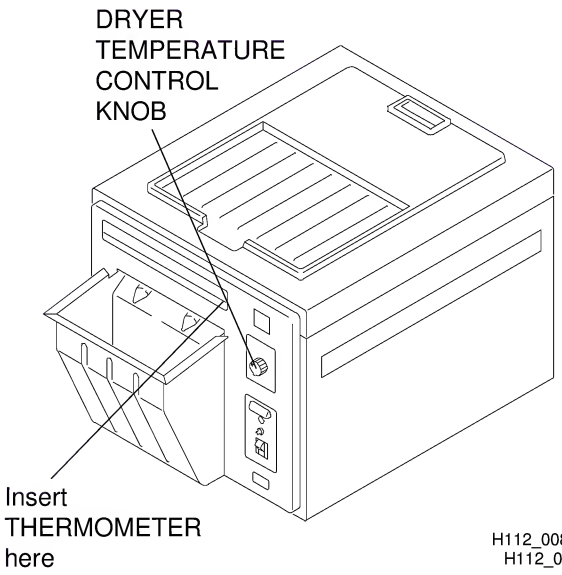
Adjusting the Speed of the MAIN DRIVE MOTOR



H112_0187ECE
H112_0187EC

DRYER HEATER

Adjustment of the Temperature of the DRYER



H112_0089ACC
H112_0089AC

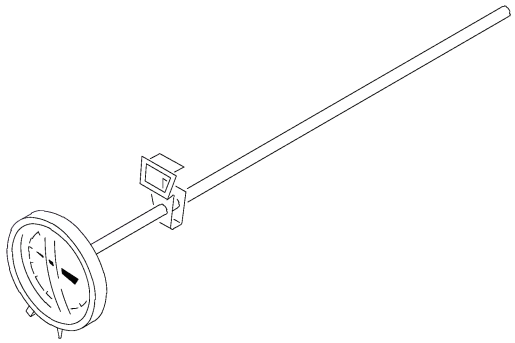
[1] To check the temperature of the DRYER, insert a THERMOMETER, Part No. 761217, under the DRYER on the drive side of the PROCESSOR. See the figure.

Important

The correct temperature for the DRYER depends on the condition of the air and on the amount and type of film fed into the PROCESSOR. Use the lowest temperature possible for good drying.

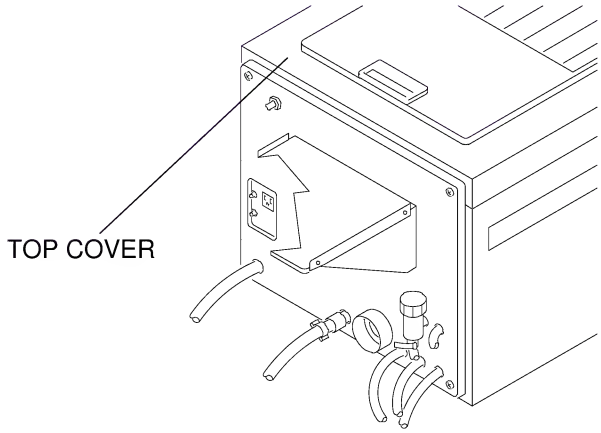
[2] If necessary, adjust the temperature of the DRYER, by rotating the DRYER TEMPERATURE CONTROL KNOB:

clockwise ↷	**increases** the temperature
counterclockwise ↶	**decreases** the temperature



H112_0040AC

Replacement of the BLOWER ASSEMBLY



H112_0028ACB
H112_0028AC

Warning
Dangerous voltage.

[1] Disconnect the main power.

[2] Remove:

- TOP COVER
- DRYER RACK
- RECEIVING END COVER
- SIDE PANELS

ESD
Possible damage from electrostatic discharge.

[3] Disconnect CONNECTORS 801 and 802, not shown, from the 800 CIRCUIT BOARD. See the figure on Page 2–26 for the position of the 800 CIRCUIT BOARD.

[4] Disconnect the CABLE ASSEMBLY from the ELECTRICAL BOX.

[5] See the figure on Page 2–26. Remove:

- 2 MOUNTING SCREWS from the BRACKET
- 4 MOUNTING SCREWS from the DRYER HEATER
- BLOWER MOTOR and BRACKET
- BLOWER MOTOR from the BRACKET

[6] Install the new BLOWER MOTOR and the 4 MOUNTING SCREWS on the BRACKET.

Note
Do not tighten the 4 MOUNTING SCREWS on the BLOWER MOTOR until Step 9.

[7] Install the BRACKET on the DRYER HEATER.

[8] Install the 6 MOUNTING SCREWS.

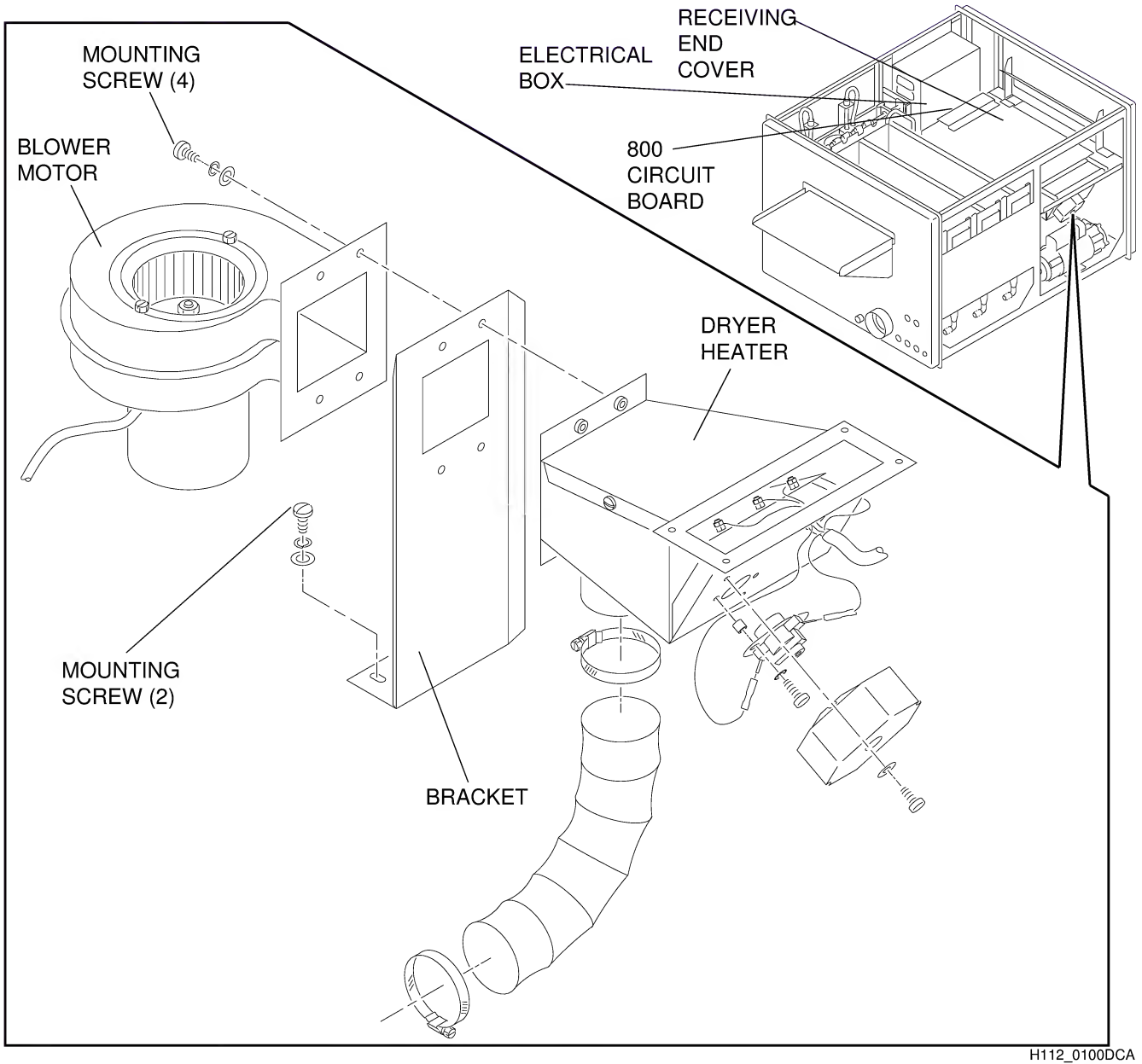
[9] Tighten the MOUNTING SCREWS.

[10] Connect the CABLE ASSEMBLY to the ELECTRICAL BOX.

[11] Install:

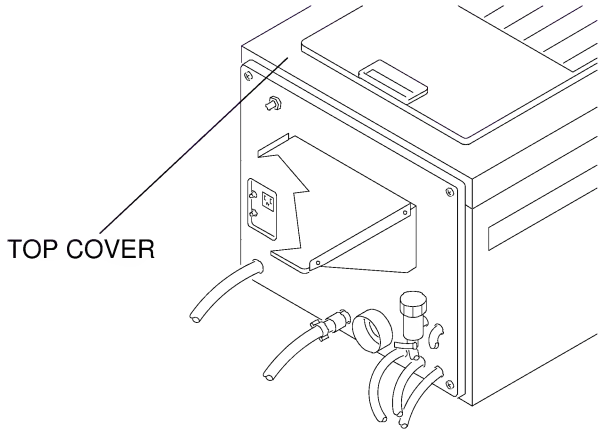
- SIDE PANELS
- RECEIVING END COVER
- DRYER RACK
- TOP COVER

Replacement of the BLOWER ASSEMBLY



H112_0100DCA
H112_0100DA

Replacement of the DRYER HEATER or the HEATER CORE



H112_0028ACB
H112_0028AC

Warning
Dangerous voltage.

[1] Disconnect the main power.

[2] Remove:

- TOP COVER
- DRYER RACK
- RECEIVING END COVER
- SIDE PANELS

ESD
Possible damage from electrostatic discharge.

[3] Disconnect CONNECTORS 801 and 802, not shown, from the 800 CIRCUIT BOARD. See the figure on Page 2–28 for the position of the 800 CIRCUIT BOARD.

[4] Disconnect TB2-1, TB2-3, TB2-5, and the ground wire from the ELECTRICAL BOX.

[5] See the figure on Page 2–28. Remove:

- EXHAUST HOSE
- 4 SCREWS under the foam strips
- 6 MOUNTING SCREWS
- DRYER HEATER

[6] Do Steps 7 - 10 to install only a new HEATER CORE inside the DRYER HEATER. To install an entire new DRYER HEATER, reverse the above procedure.

[7] Loosen the 2 SCREWS.

[8] Remove the HEATER TOP COVER.

[9] Remove the HEATER CORE from the DRYER HEATER:

(a) Remove the 4 HEX NUTS, not shown.

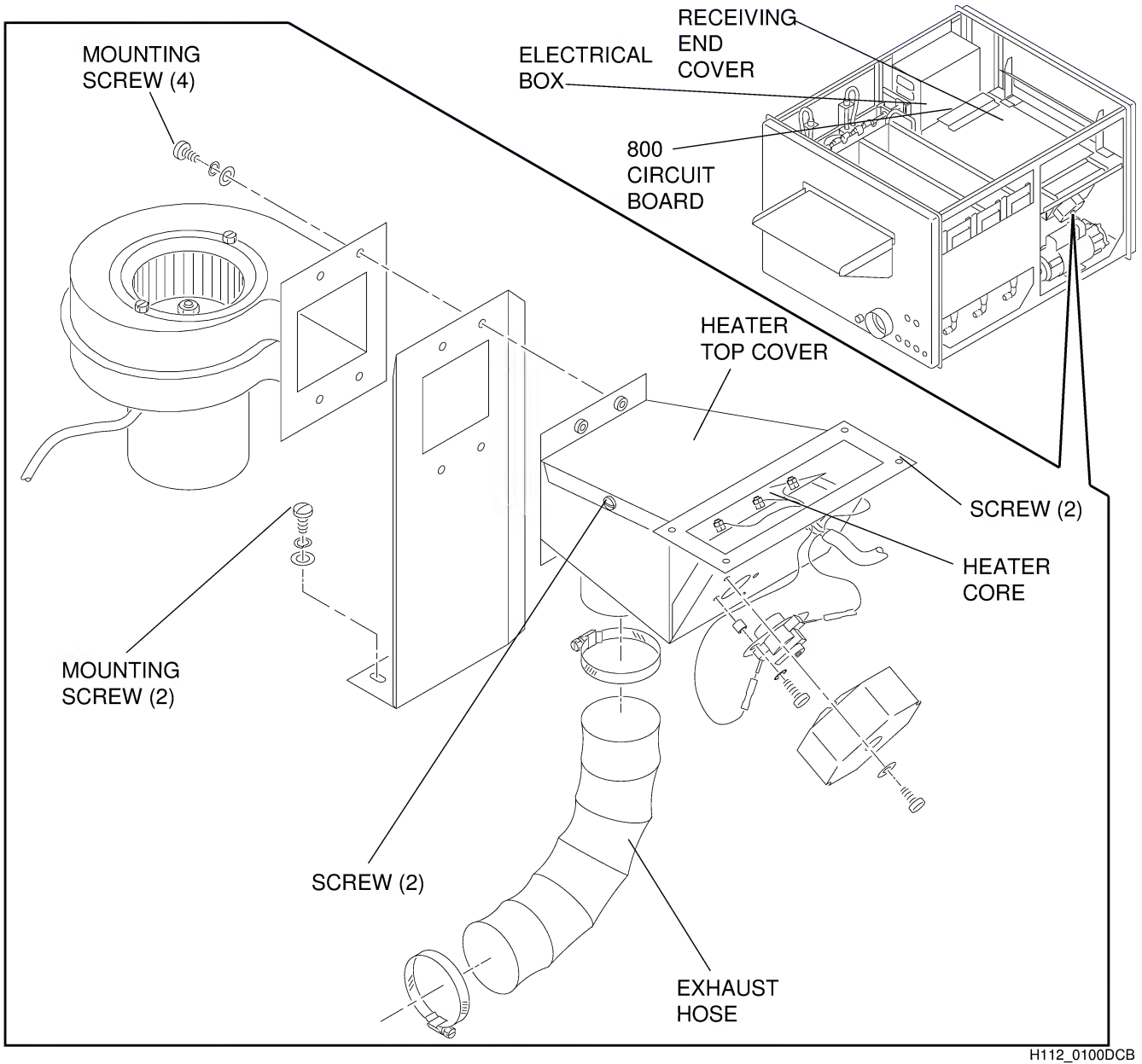
(b) Loosen the 4 MOUNTING SCREWS, not shown.

(c) Remove the HEATER CORE.

[10] Reverse the procedure to install the new HEATER CORE in the DRYER HEATER.

[11] Reverse Steps 2 - 5 to install the DRYER HEATER in the PROCESSOR.

Replacement of the DRYER HEATER or the HEATER CORE



H112_0100DCB
H112_0100DA

Plumbing

Adjustment of the Developer Temperature

[1] Remove the TOP COVER.

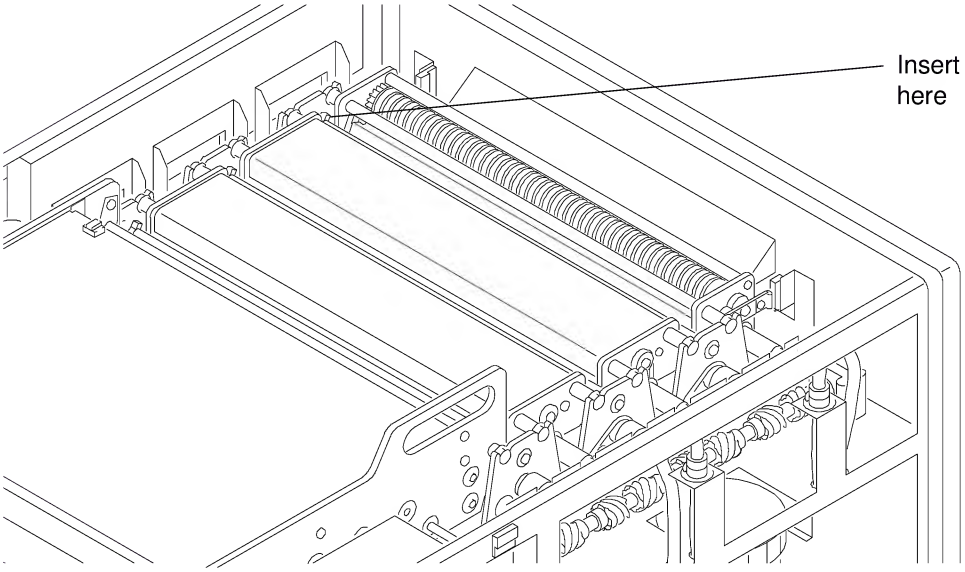
[2] Insert a THERMOMETER of known accuracy, such as Part No. 761217, into the nondrive side of the DEVELOPER TANK between the SIDE PLATE of the DEVELOPER RACK and the RACK SUPPORT.

Note

If checking both the Standard developer temperature and the Extended developer temperature, check for Standard Mode first.

The correct temperatures are:

Standard: 33.3˚C ± 0.3˚C (92.0˚F 0.5˚F)
Extended: 35˚C ± 0.3˚C (95.0˚F 0.5˚F)



H112_0121BCA
H112_0121BA

Caution

- Possible damage from electrostatic discharge. Use an ESD wrist strap.
- Use the POTENTIOMETER ADJUSTING TOOL TL-1481 to adjust R301 and R302.

[3] If a developer temperature adjustment is necessary, adjust R301 and R302 on the 300 CIRCUIT BOARD.

(a) Remove the drive SIDE PANEL from the PROCESSOR.

(b) Open the ELECTRICAL BOX.

(c) Use the POTENTIOMETER ADJUSTING TOOL TL-1481 to adjust the developer temperature by rotating R302 for Standard Mode or R301 for Extended Mode.

clockwise ↷	**increases** the temperature
counterclockwise ↶	**decreases** the temperature

(d) Allow the developer to reach the new, adjusted temperature.

(e) Check the developer temperature in the DEVELOPER TANK with the THERMOMETER.

(f) If the developer temperature is not correct, do Steps (c) - (e) again.

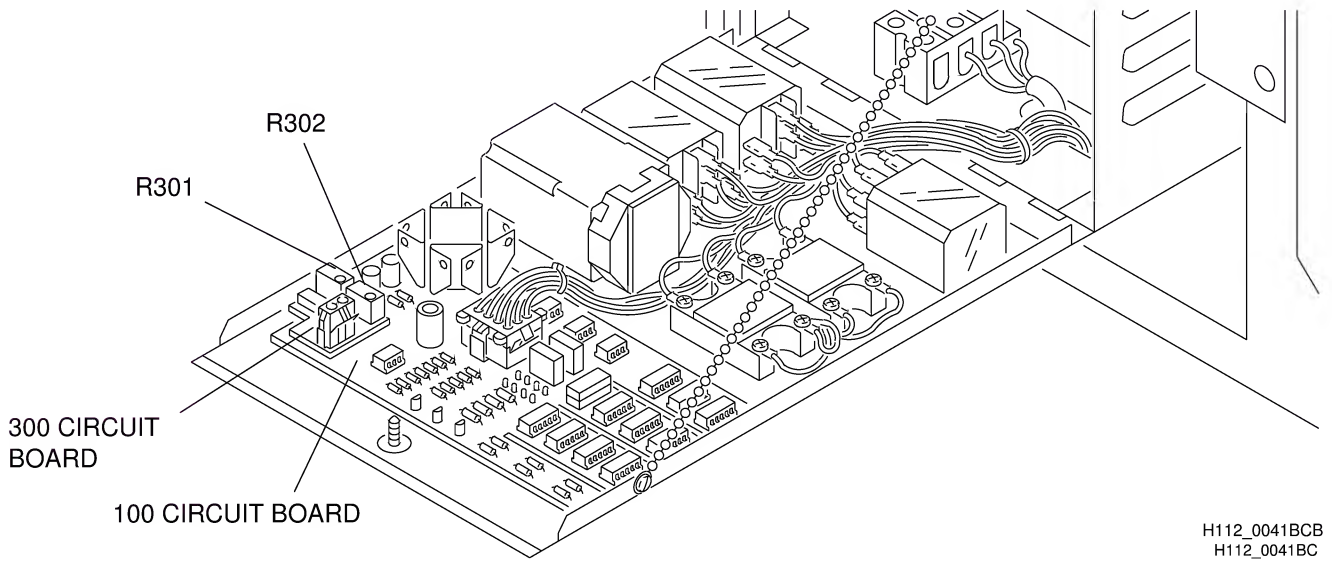
(g) Close the ELECTRICAL BOX and install the SIDE PANEL.

[4] If the METER does not display the same temperature as the THERMOMETER, adjust the METER. See Page 2–31.

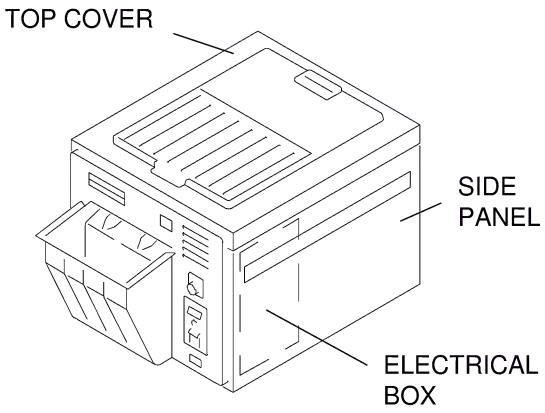
Important

- After changing from Extended Mode to Standard Mode, set the DRYER TEMPERATURE CONTROL KNOB to “0” and remove the TOP COVER for venting. Check that the METER displays the correct temperature before adjusting R302 or processing film.
- Do **not** process films until the METER shows that the developer is at the correct temperature.

[5] Install the TOP COVER.



Adjustment of the Developer Temperature METER



H112_0042ACB
H112_0042AC

[1] Check:

- that the water to the PROCESSOR is on
- that the PROCESSOR is energized
- that the temperature displayed on the METER has stablized
- for agitation of the developer in the DEVELOPER TANK
- that the level of the developer is correct

[2] Remove the TOP COVER.

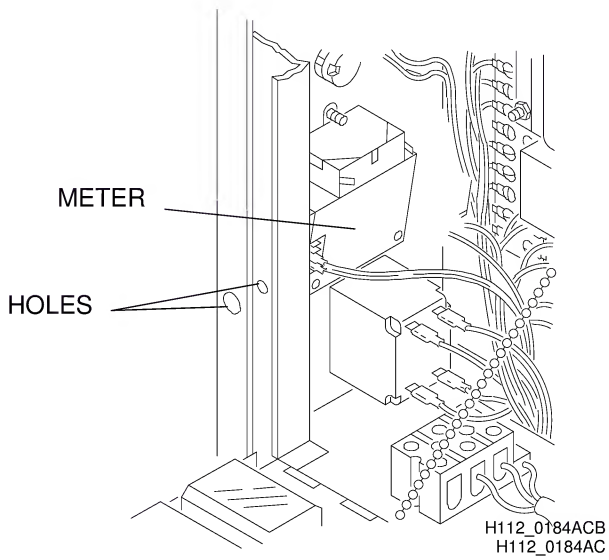
[3] Check the temperature of the developer.

(a) Insert a THERMOMETER of known accuracy, such as Part No. 761217, into the nondrive side of the DEVELOPER TANK between the SIDE PLATE of the DEVELOPER RACK and the RACK SUPPORT. See the figure on Page 2–29.

(b) Compare the temperatures on the THERMOMETER and on the METER.

Note

The correct temperature is:
Standard: 33.3˚C ± 0.3˚C (92.0˚F ± 0.5˚F)
Extended: 35˚C ± 0.3˚C (95.0˚F ± 0.5˚F)



H112_0184ACB
H112_0184AC

[4] If the temperatures are not the same, adjust the METER.

(a) Remove the drive SIDE PANEL from the PROCESSOR.

Caution

Possible damage from electrostatic discharge. Use an ESD wrist strap and a POTENTIOMETER ADJUSTING TOOL TL-1481.

(b) Open the ELECTRICAL BOX.

(c) Check that CR10 on the 100 CIRCUIT BOARD is blinking.

(d) After CR10 has blinked for 2 minutes, insert the POTENTIOMETER ADJUSTING TOOL TL-1481 through the holes in the edge of the ELECTRICAL BOX. See the figure above.

(e) Rotate TL-1481 to adjust the POTENTIOMETER, not shown, on the METER.

clockwise ↷	**increases** the temperature
counterclockwise ↶	**decreases** the temperature display

(f) Check the developer temperature with the THERMOMETER. If the temperature is not the same as on the METER, adjust the METER again.

[5] Close the ELECTRICAL BOX.

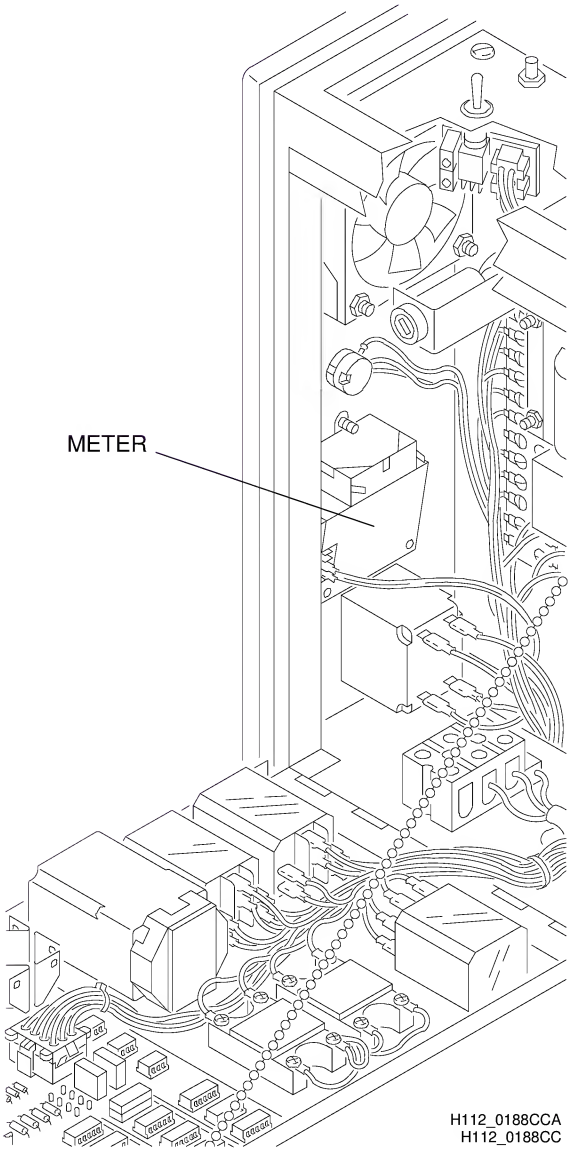
[6] Check for correct operation of the PROCESSOR.

(a) Check that the DRYER and developer are at the correct temperatures.

(b) Feed 3 or 4 test sheets of film through the PROCESSOR.

[7] Install the drive SIDE PANEL and the TOP COVER.

Removal of the Developer Temperature METER



[1] De-energize the PROCESSOR.

[2] Remove the TOP COVER and the drive SIDE PANEL.

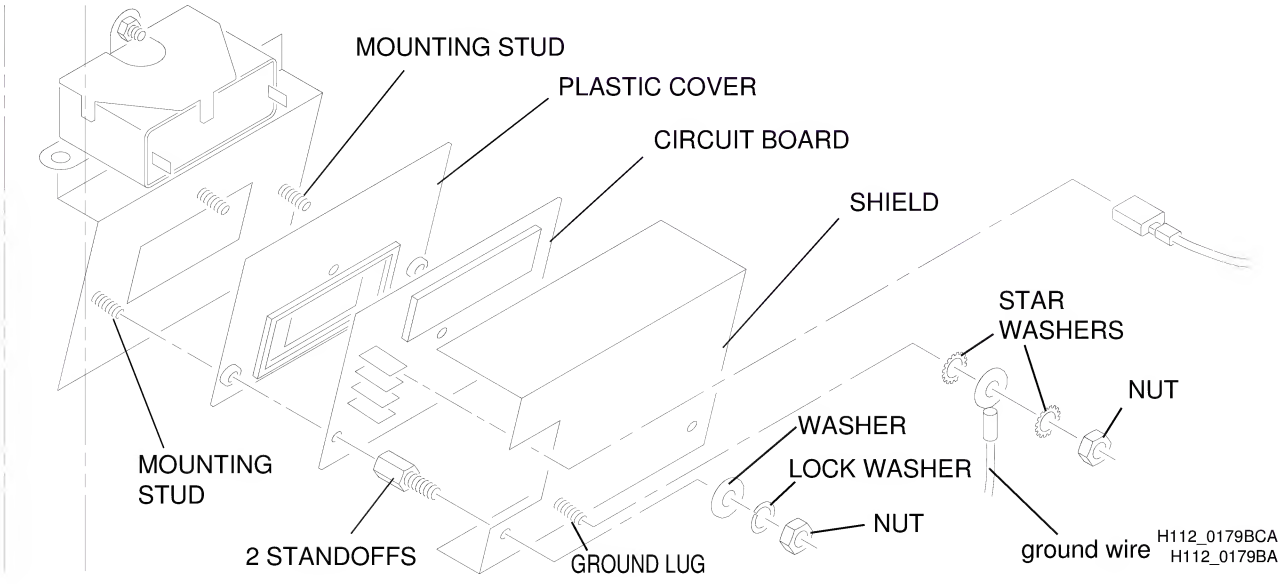
ESD
Possible damage from electrostatic discharge.

[3] Open the ELECTRICAL BOX.

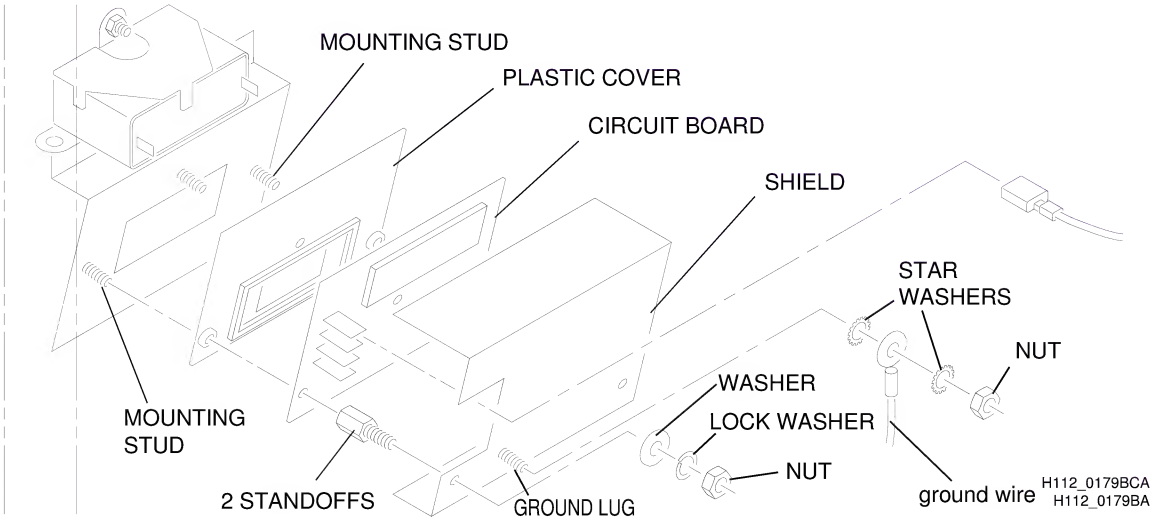
[4] Remove from the METER:

- NUTS
- STAR WASHERS
- ground wire
- LOCK WASHER
- WASHER
- wire No. 27
- wire No. 13
- the red wire
- the black wire
- SHIELD
- 2 STANDOFFS

[5] Remove the CIRCUIT BOARD and the PLASTIC COVER.



Installation of the Developer Temperature METER



ESD

Possible damage from electrostatic discharge.

[1] Align the holes of the PLASTIC COVER and the CIRCUIT BOARD.

[2] Install the PLASTIC COVER and the CIRCUIT BOARD on the MOUNTING STUDS inside the ELECTRICAL BOX.

[3] Install the 2 STANDOFFS on the front and back MOUNTING STUDS.

Note

The center MOUNTING STUD is not used.

[4] Install the SHIELD on the 2 STANDOFFS.

[5] Install on each STANDOFF:

- WASHER
- LOCK WASHER
- NUT

[6] Connect:

- the red wire to the top TERMINAL
- the black wire to the second TERMINAL
- wire No. 27 to the third TERMINAL
- wire No. 13 to the bottom TERMINAL

[7] Install on the GROUND LUG:

- a STAR WASHER
- the ground wire
- another STAR WASHER
- a NUT

[8] Check that the METER operates correctly.

(a) Energize the PROCESSOR.

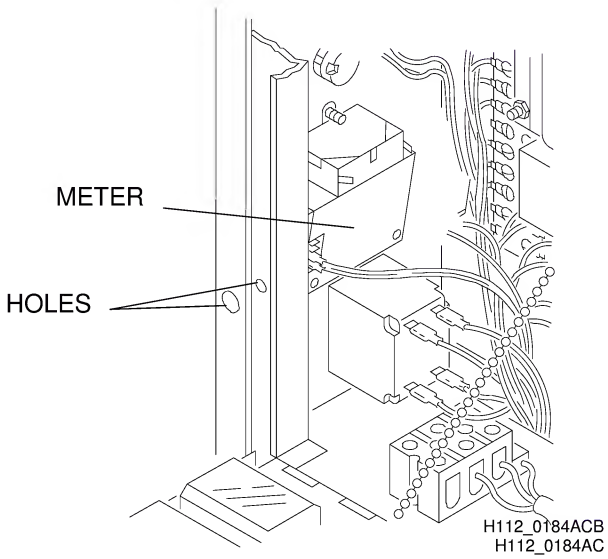
(b) Insert a THERMOMETER of known accuracy in the DEVELOPER TANK.

(c) Check that the temperature on the THERMOMETER and on the METER are the same.

Note

The METER is operating correctly if the temperatures are the same. The correct developer temperature is:
Standard: 33.3˚C 0.3˚C (92.0˚F 0.5˚F)
Extended: 35˚C ± 0.3˚C (95.0°F ± 0.5°F)

(d) If the temperatures are the same, advance to Step 9 .
If the METER does not display the correct temperature, do Steps (e) to (g) below until the METER displays the correct temperature.



ESD

Possible damage from electrostatic discharge.

(e) Insert the POTENTIOMETER ADJUSTING TOOL TL-1481 through the holes in the edge of the ELECTRICAL BOX and rotate the POTENTIOMETER, not shown, on the CIRCUIT BOARD.

clockwise ↷	**increase** the temperature
counterclockwise ↶	**decrease** the temperature

Important

If decreasing the developer temperature, wait a few minutes before checking the developer temperature.

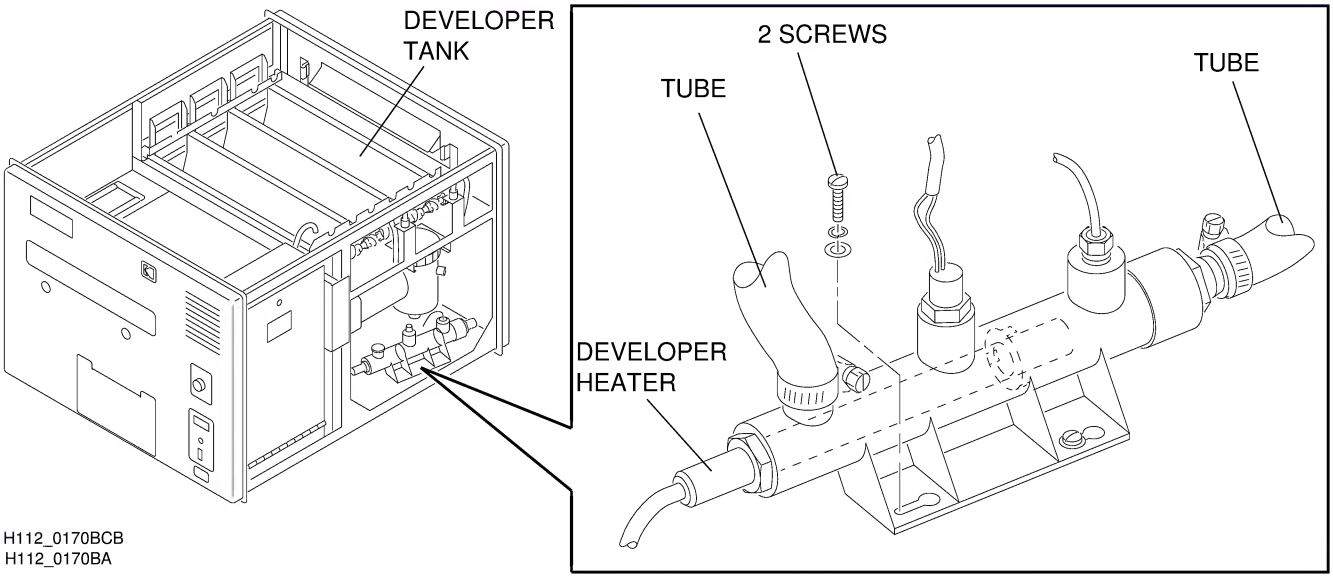
(f) Check that the developer temperature on the THERMOMETER in the DEVELOPER TANK and on the METER are the same. If necessary, adjust the POTENTIOMETER again.

(g) Feed 3 sheets of test film to check the operation of the PROCESSOR.

[9] Close the ELECTRICAL BOX

[10] Install the SIDE PANEL and the TOP COVER.

Replacement of the DEVELOPER HEATER



H112_0170BCB
H112_0170BA

[1] Disconnect the main power.

[2] Drain the DEVELOPER TANK, or install CLAMPS on the 2 TUBES to the THERMOWELL.

[3] Disconnect the wires to the DEVELOPER HEATER at TB2-9 and TB2-10.

Caution

When you remove the DEVELOPER HEATER from the THERMOWELL, a small amount of developer may spill. Clean any spilled solution.

[4] Remove:

- 2 SCREWS
- THERMOWELL
- DEVELOPER HEATER from the THERMOWELL

Caution

- Use only SEALANT TL-3230. Any other SEALANT will cause damage to the plastic. See the instructions packed with the SEALANT.
- Overtightening the DEVELOPER HEATER may cause damage to the THERMOWELL.

[5] Apply SEALANT TL-3230 to the threads of the new DEVELOPER HEATER.

(a) Cut the tube of SEALANT on an angle.

(b) Apply a small amount of SEALANT to the threads.

(c) Use the end of the tube of SEALANT to press the SEALANT into the threads.

[6] Insert the new DEVELOPER HEATER into the THERMOWELL.

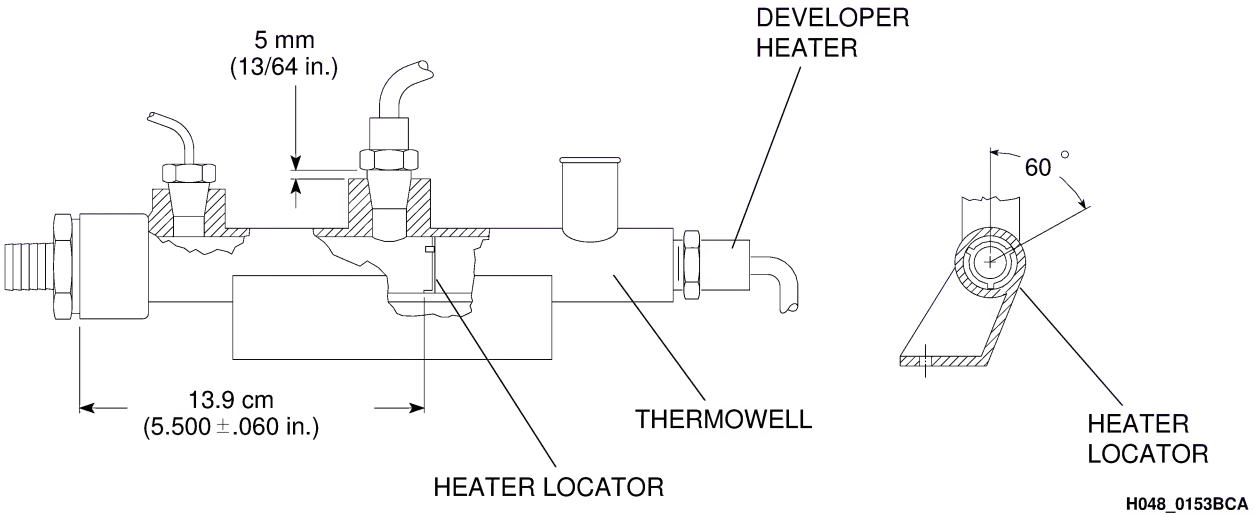
[7] Check that the DEVELOPER HEATER is in the correct position through the HEATER LOCATOR. See the figure below.

[8] Hand tighten the DEVELOPER HEATER plus ½ turn.

[9] Install the THERMOWELL and 2 SCREWS.

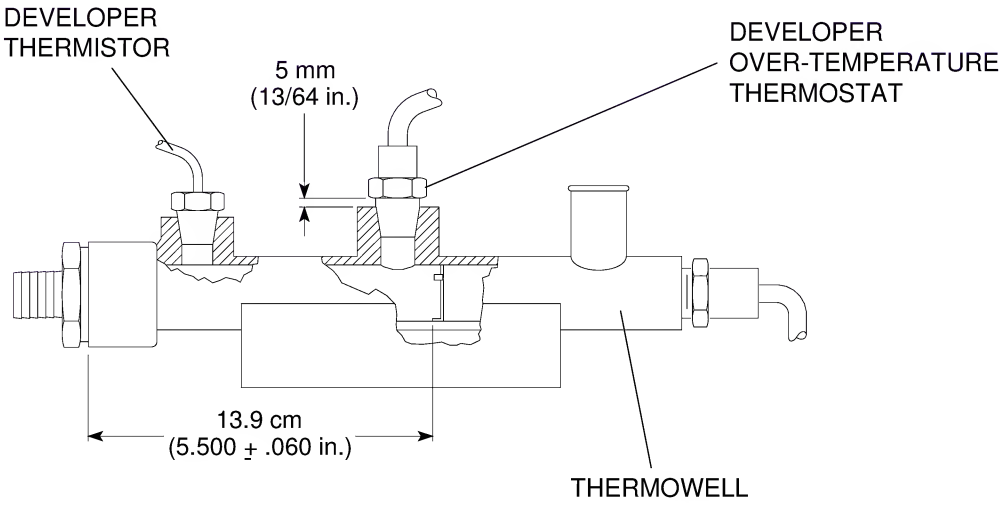
[10] Connect the wires to TB2-9 and TB2-10.

[11] Remove the CLAMPS from the 2 TUBES, or fill the DEVELOPER TANK.



H048_0153BCA
H048_0153BA

Replacement of the DEVELOPER OVER-TEMPERATURE THERMOSTAT



H048_0162BCA
H048_0162BA

[1] Disconnect the main power.

[2] Drain the DEVELOPER TANK, or install CLAMPS on the 2 TUBES to the THERMOWELL. See the figure on Page 2–36.

[3] Disconnect the OVER-TEMPERATURE THERMOSTAT at TB4-15, TB4-16, TB4-8, and TB4-9.

Caution

When you remove the OVER-TEMPERATURE THERMOSTAT from the THERMOWELL, a small amount of developer may spill. Clean any spilled solution.

[4] Remove the OVER-TEMPERATURE THERMOSTAT from the THERMOWELL.

Caution

Use only SEALANT TL-3230. Any other SEALANT will cause damage to the plastic. See the instructions packed with the SEALANT.

[5] Apply SEALANT TL-3230 to the threads of the new OVER-TEMPERATURE THERMOSTAT.

(a) Cut the tube of SEALANT on an angle.

(b) Apply a small amount of SEALANT to the threads.

(c) Use the end of the tube of SEALANT to press the SEALANT into the threads.

Caution

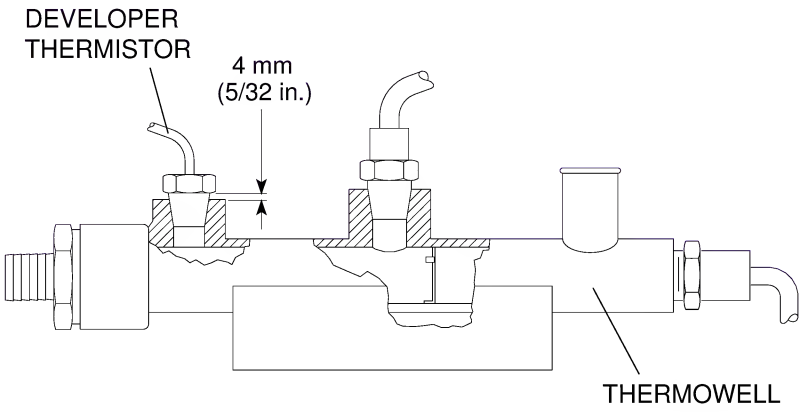
Do not install the new OVER-TEMPERATURE THERMOSTAT below the position shown in the figure.

[6] Install the new OVER-TEMPERATURE THERMOSTAT 5 mm (13/64 in.) from the THERMOWELL. See the figure above.

[7] Connect TB4-15, TB4-16, TB4-8, and TB4-9 to the new OVER-TEMPERATURE THERMOSTAT.

[8] Remove the CLAMPS from the 2 TUBES, or fill the DEVELOPER TANK.

Replacement of the DEVELOPER THERMISTOR



H112_0180BCA
H112_0180BA

[1] Disconnect the main power.

[2] Drain the DEVELOPER TANK, or install CLAMPS on the 2 TUBES to the THERMOWELL. See the figure on Page 2–36.

[3] Disconnect the DEVELOPER THERMISTOR at TB4-13 and TB4-14.

Caution

When you remove the DEVELOPER THERMISTOR from the THERMOWELL, a small amount of liquid may spill. Clean any spilled solution.

[4] Remove the DEVELOPER THERMISTOR from the THERMOWELL.

Caution

Use only SEALANT TL-3230. Any other SEALANT will cause damage to the plastic. See the instructions packed with the SEALANT.

[5] Apply SEALANT TL-3230 to the threads of the new DEVELOPER THERMISTOR.

- **(a)** Cut the tube of SEALANT on an angle.
- **(b)** Apply a small amount of SEALANT to the threads.
- **(c)** Use the end of the tube of SEALANT to press the SEALANT into the threads.

Caution

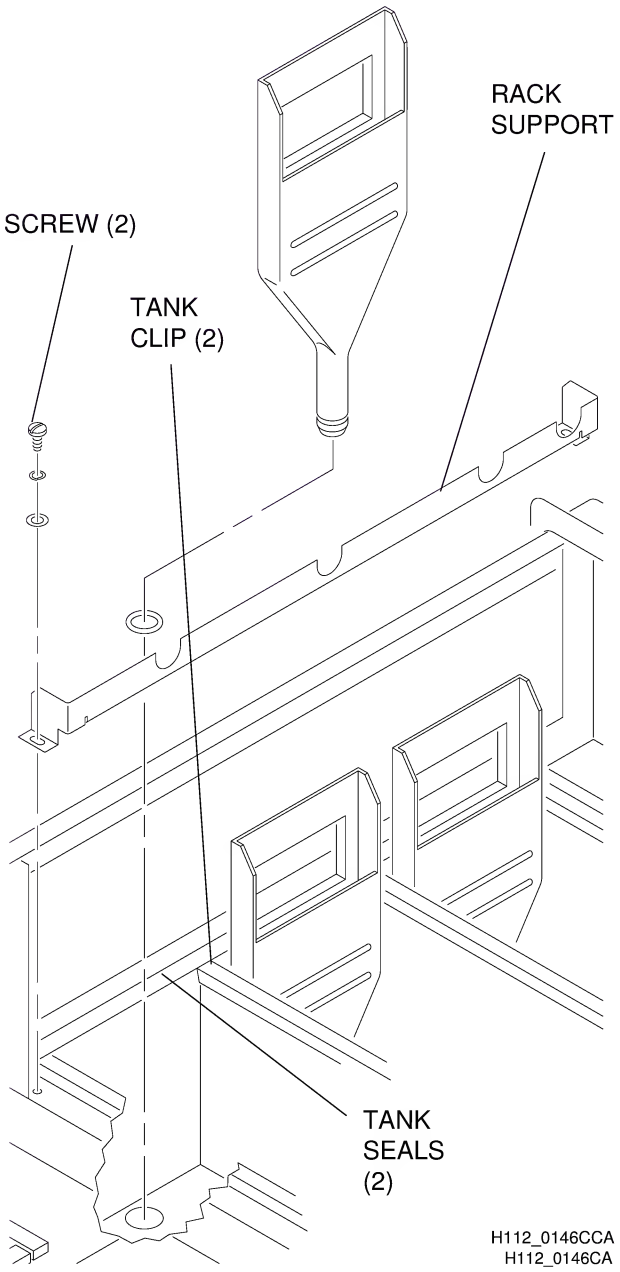
Do not install the new DEVELOPER THERMISTOR lower than shown in the figure.

[6] Install the new DEVELOPER THERMISTOR 4 mm (5/32 in.) from the DEVELOPER THERMOWELL.

[7] Connect TB4-13 and TB4-14 to the new DEVELOPER THERMISTOR.

[8] Remove the CLAMPS from the 2 TUBES, or fill the DEVELOPER TANK.

Replacement of the HEAT EXCHANGERS



Warning
Dangerous voltage.

[1] Disconnect the main power.

[2] Disconnect the water supply.

[3] Drain the 3 TANKS.

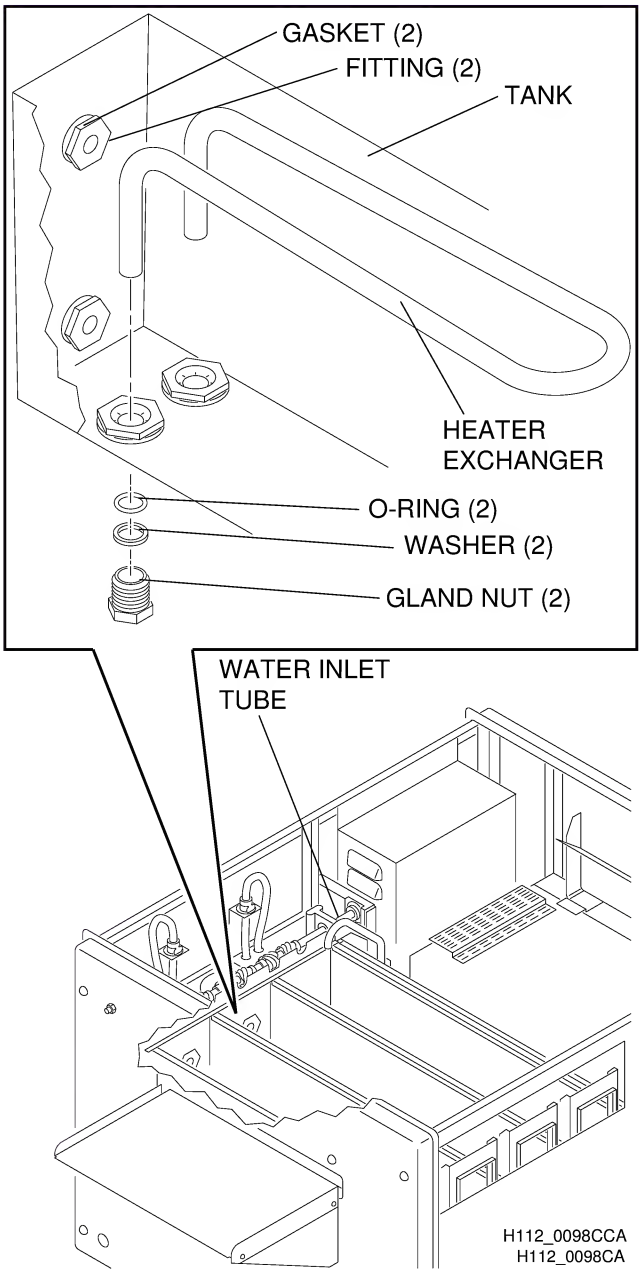
[4] Remove:

- 2 SCREWS from the RACK SUPPORT
- RACK SUPPORT
- TANK SEALS
- TANK CLIPS

[5] Disconnect all tubing from the TANK.

[6] If necessary, remove the 2 FITTINGS and the WATER INLET TUBE. See the figure on Page 2–42.

[7] Lift the nondrive side of the TANK, and then remove the TANK from the PROCESSOR.



[8] Remove:

- 2 GLAND NUTS
- 2 O-RINGS
- 2 WASHERS
- HEAT EXCHANGER from the TANK

[9] Install:

- new HEAT EXCHANGER
- 2 O-RINGS
- 2 WASHERS
- 2 GLAND NUTS
- TANK in the PROCESSOR
- 2 FITTINGS, with new GASKETS if in the fixer TANK
- WATER INLET TUBE, wash TANK only
- TANK SEALS
- TANK CLIPS
- tubing
- RACK SUPPORT

[10] Pull the RACK SUPPORT toward the nondrive side of the PROCESSOR and install the 2 SCREWS.

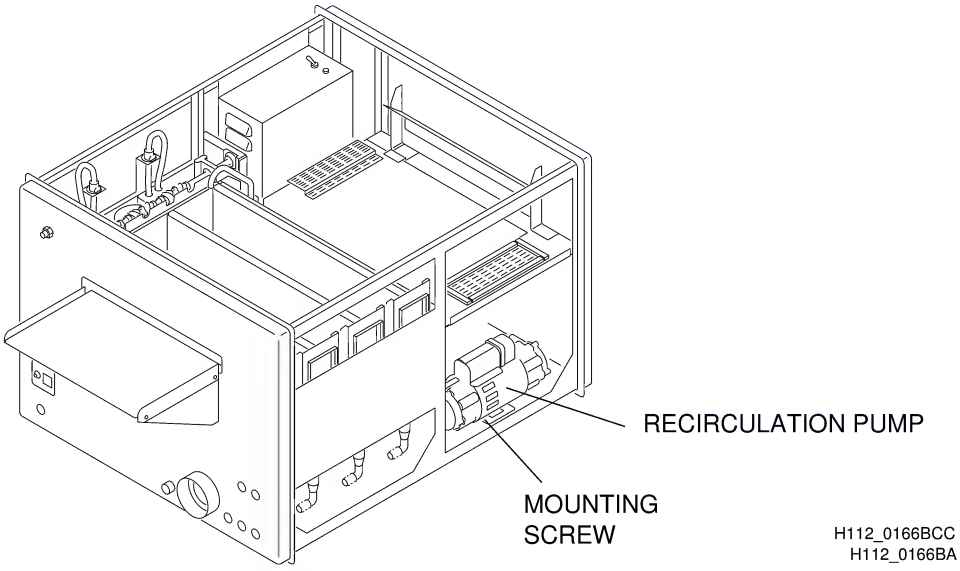
[11] Connect the water and fill the 3 TANKS with water.

[12] Check for leakage.

[13] Drain the water from the developer and fixer TANKS. Fill the 2 TANKS with developer and fixer.

[14] Connect the main power.

Replacement of the RECIRCULATION PUMP



Warning

Dangerous voltage.

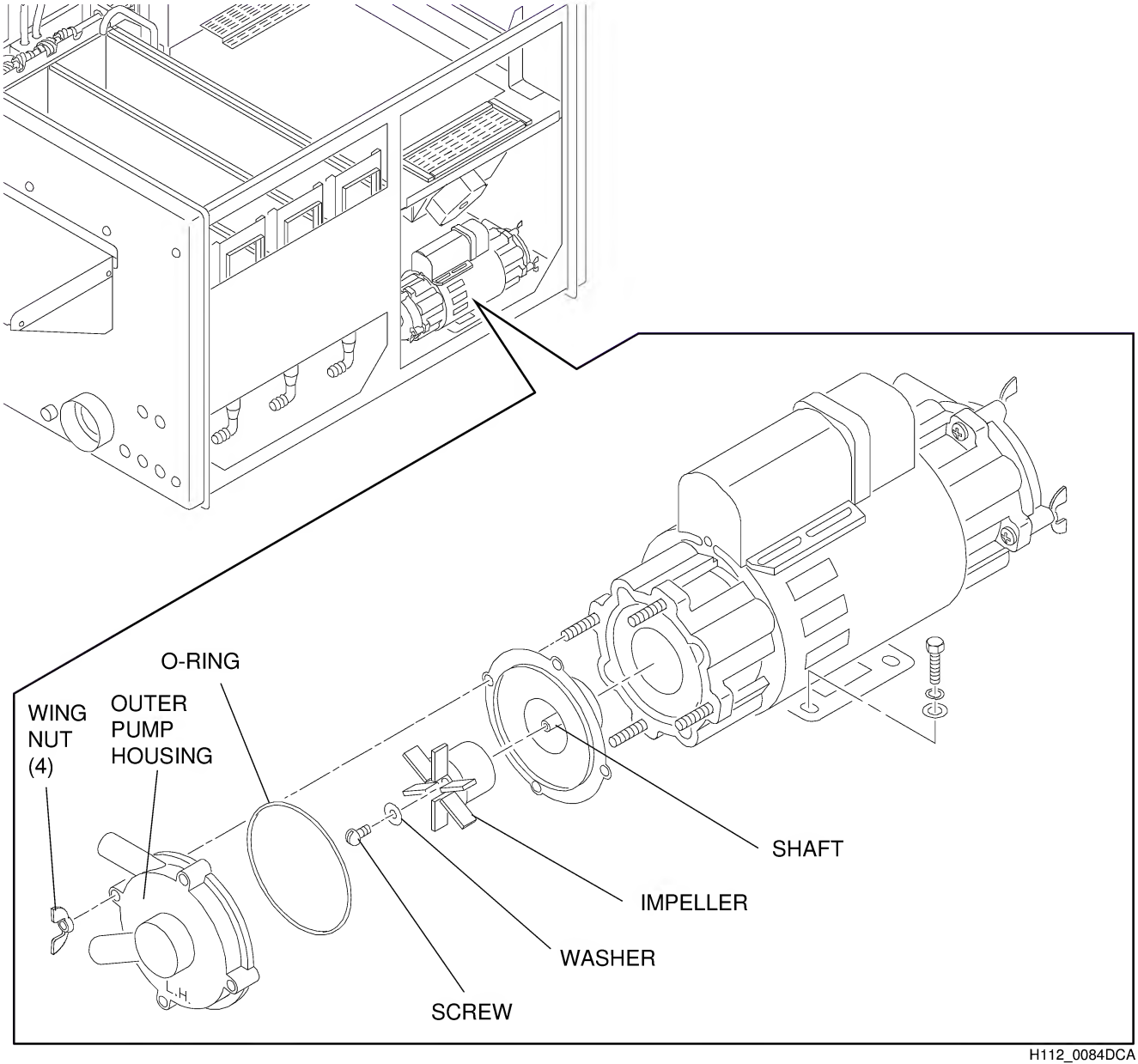
[1] Disconnect the main power.
[2] Disconnect the water supply.
[3] Remove the TOP COVER and 2 SIDE PANELS.
[4] Drain the 3 TANKS.
[5] Use PINCH CLAMPS on the tubing to prevent leakage.
[6] Disconnect the tubing to the RECIRCULATION PUMP.
[7] Remove the MOUNTING SCREWS.
[8] Remove the RECIRCULATION PUMP.
[9] Reverse the above procedure to install a new RECIRCULATION PUMP.
[10] Connect the water supply.
[11] Remove the PINCH CLAMPS.
[12] Fill the 3 TANKS with water.
[13] Connect the main power.

Caution

Never operate the RECIRCULATION PUMPS if the TANKS are empty.

[14] Actuate the RECIRCULATION PUMPS.
[15] Check for agitation on the surface of the solutions.
[16] Check for leakage.
[17] Drain the water thoroughly from the developer and fixer TANKS and fill the TANKS with developer and fixer.

Replacement of the O-RING



H112_0084DCA
H112_0084DA

Warning
Dangerous voltage.

[1] Disconnect the main power.

[2] Remove the TOP COVER and the 2 SIDE PANELS.

[3] Install PINCH CLAMPS on the tubing of the RECIRCULATION PUMP to prevent leakage.

[4] Remove:

- 4 WING NUTS
- OUTER PUMP HOUSING
- O-RING

[5] Check that the O-RING is correctly seated.

[6] Install the OUTER PUMP HOUSING and the 4 WING NUTS.

[7] Remove the PINCH CLAMPS.

[8] Connect the main power.

Caution

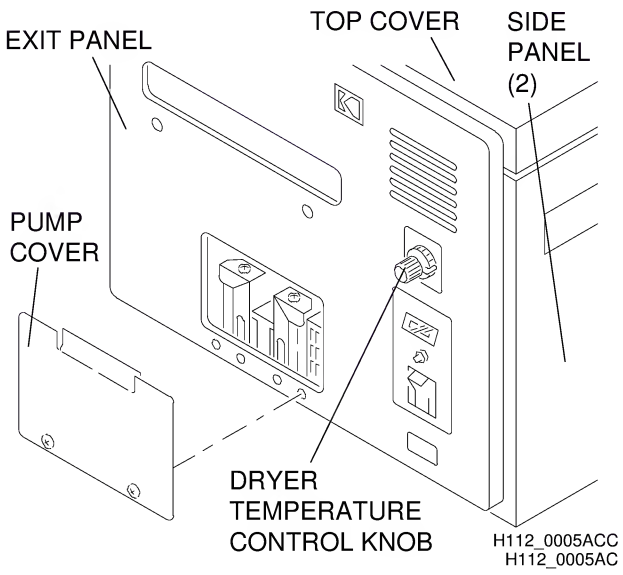
Never operate the RECIRCULATION PUMPS if the TANKS are empty.

[9] Actuate the RECIRCULATION PUMPS.

[10] Check for agitation on the surface of the solutions.

[11] Check for leakage.

Replacement of a REPLENISHMENT PUMP



Warning

Dangerous voltage.

[1] Disconnect the main power.

[2] Disconnect the water supply.

[3] Remove:

- TOP COVER
- 2 SIDE PANELS
- RECEIVING BIN
- DRYER TEMPERATURE CONTROL KNOB
- PUMP COVER
- EXIT PANEL

[4] Disconnect the 2 MOTOR LEADS TB3-6 and TB3-2 and the ground wire.

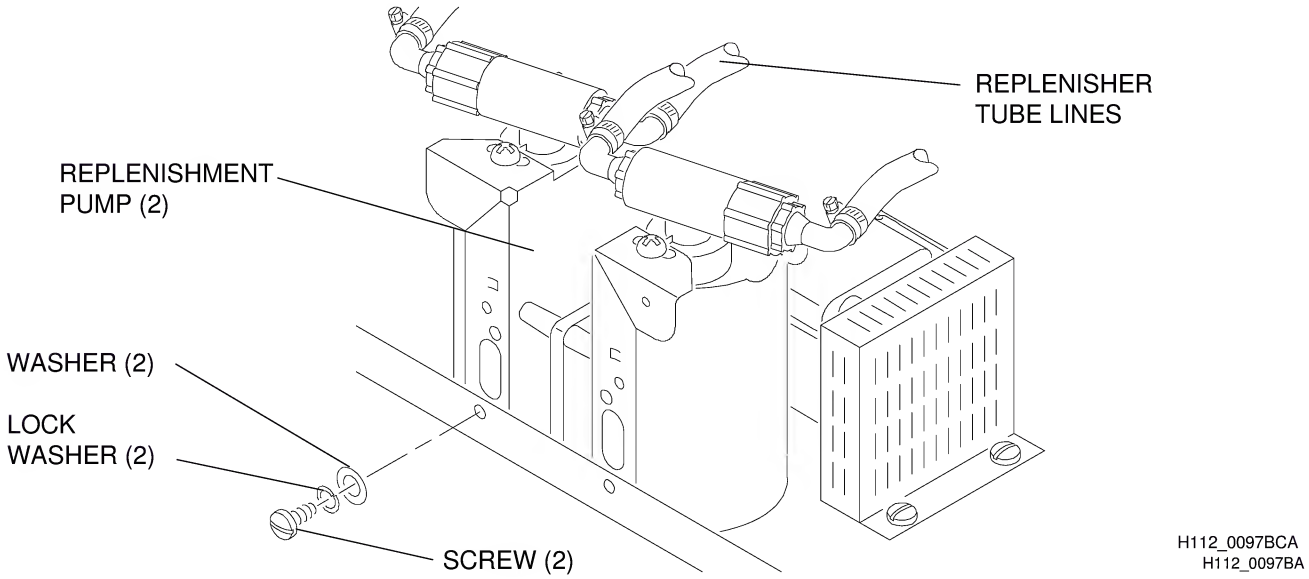
[5] Install a CLAMP on the REPLENISHER TUBE.

[6] Remove the REPLENISHER TUBE LINES from the REPLENISHMENT PUMP.

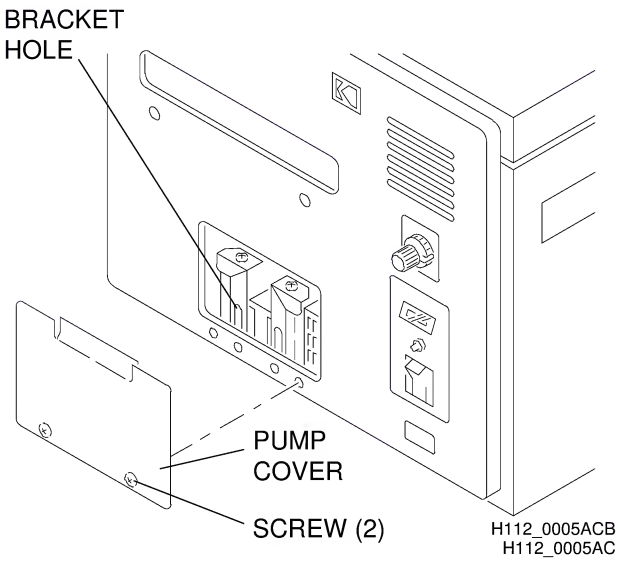
[7] Remove and keep the 2 SCREWS, the 2 WASHERS, and the 2 LOCK WASHERS.

[8] Remove the REPLENISHMENT PUMP.

[9] Reverse the above procedure to install a new REPLENISHMENT PUMP.



Adjustment of the REPLENISHMENT PUMPS



[1] Remove the TOP COVER and the RECEIVING BIN.

[2] Loosen the 2 SCREWS and remove the PUMP COVER.

[3] Actuate the DETECTOR SWITCH, by lifting the top DETECTOR ROLLER of the DETECTOR CROSSOVER ASSEMBLY, until the ADJUSTMENT SCREW is visible through the hole in the BRACKET.

[4] Loosen the SETSCREW.

Caution

Do not adjust the LOCKNUT on the other end of the ADJUSTMENT SCREW.

[5] Rotate the ADJUSTMENT SCREW:

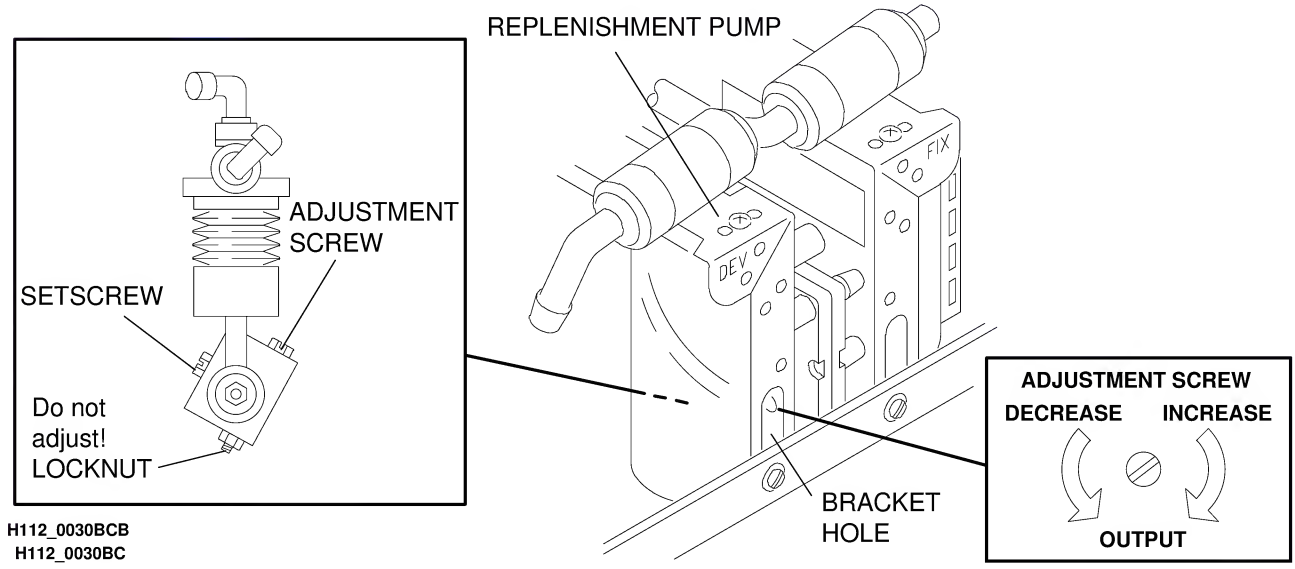
clockwise ↷	increases the flow rate
counterclockwise ↶	decreases the flow rate

[6] Tighten the SETSCREW.

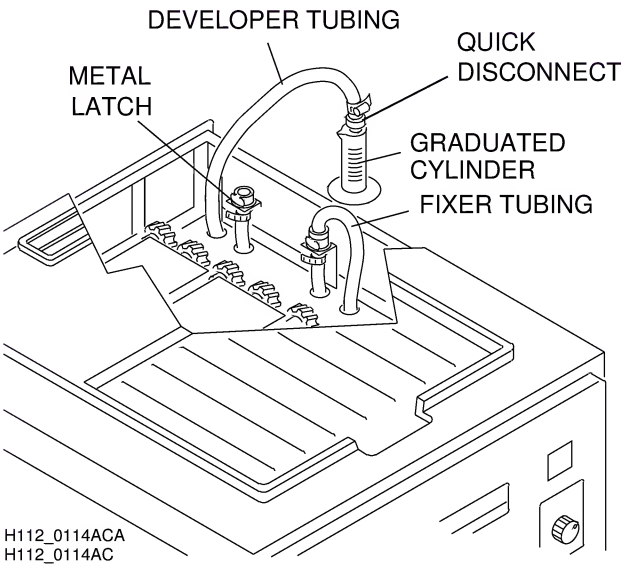
[7] See Page 2–46 and check the flow rates. If necessary, do Steps 2 - 6 again. See the table on Page 2–46 for various replenishment rates.

[8] Install the TOP COVER, the PUMP COVER, and the RECEIVING BIN.

[9] Check that the REPLENISHMENT PUMPS operate correctly by feeding a sheet of film into the PROCESSOR. See Page 2–2.



Adjustment of the Replenishment Flow Rates



[1] Remove the TOP COVER.

[2] Lift the top DETECTOR ROLLER of the DETECTOR CROSSOVER ASSEMBLY.

[3] Check that the replenisher solutions flow freely through the TUBING along the drive side of the PROCESSOR.

[4] Press the METAL LATCH on the red QUICK DISCONNECT to disconnect the DEVELOPER TUBING.

[5] Pull the DEVELOPER TUBING slightly by rotating the DEVELOPER TUBING over the edge of the PROCESSOR.

[6] Insert the DEVELOPER TUBING into a GRADUATED CYLINDER.

[7] Lift the top DETECTOR ROLLER of the DETECTOR CROSSOVER ASSEMBLY for the correct time. See the table on the next page.

Note

The REPLENISHMENT PUMP will operate 3 seconds after you release the DETECTOR ROLLER.

[8] Check that the amount of developer in the GRADUATED CYLINDER is the same as in the table.

[9] If necessary, adjust the REPLENISHMENT PUMP. See Page 2–45 for the adjustment procedure.

[10] If necessary, so Steps 7 - 9 again.

[11] Connect the QUICK DISCONNECT.

[12] Do this procedure again to check the flow rate of the fixer.

Film Size Processed	Use Condition	Average Amount of Film per 8 Hours of Processor Operation	Replenishment Flow Rate			
			mL per 35 cm (14 in.) 28 sec of Film Travel		mL per 43 cm (17 in.) 34 sec of Film Travel	
			Developer	Fixer	Developer	Fixer
Only 35 x 35 cm (14 x 14 in.) film	High Medium Low	90 sheets or more 31 - 89 sheets 30 sheets or less	50 65 80	70 85 100	—	—
Average size film intermix	High Medium Low	115 sheets or more 41 - 114 sheets 40 sheets or less	50 65 80	70 85 100	—	—
Only 35 x 43 cm (14 x 17 in.) film	High Medium Low	75 sheets or more 26 - 74 sheets 25 sheets or less	—	—	60 80 100	85 100 120

Film Size Processed	Use Condition	Average Amount of Film per 8 Hours of Processor Operation	Replenishment Flow Rate			
			mL per 24 cm 26 sec of Film Travel in Standard Mode		mL per 24 cm 36 sec of Film Travel in Extended Mode	
			Developer	Fixer	Developer	Fixer
Only 18 x 24 cm Kodak Min-R E Film	High Medium Low	150 sheets or more 60 - 149 sheets 59 sheets or less	— 	— 	20 27 35	30 35 40
Only 18 x 24 cm Kodak Min-R M Film	High Medium Low	150 sheets or more 60 - 149 sheets 59 sheets or less	30 30 35	30 35 40	— 	—
Only 18 x 24 cm Kodak Min-R H Film	High Medium Low	150 sheets or more 60 - 149 sheets 59 sheets or less	50 50 50	30 35 40	— 	—
Only 18 x 24 cm Kodak Min-R 2000 Film	High Medium Low	150 sheets or more 60 - 149 sheets 59 sheets or less	20 20 20	30 35 40	— 	—

Note

- *Kodak* RP *X-Omat* Chemicals are recommended.
- Replenishment rates are based on one sheet of 18 x 24 cm film. If feeding two sheets, double the replenishment rates.
- For best results, feed film consistently.
- Slight sensitometric changes will occur as subsequent films are processed through a freshly started process. This is known as “seasoning” and is normal with any photographic process. Process control targets may have to be adjusted slightly to compensate.
- For 30 sheets of film or less per day, flooded replenishment is recommended.
- Film travel time includes feed time plus an approximate 3-second delay.

Section 3: Periodic Maintenance

General Information

Note

- This section includes additional procedures that are not in the Operator Manual, Publication No. 981799.
- To provide for optimum operation of the PROCESSOR, it is important to use the following procedures.

[1] Process 5 sheets of unprocessed film before you begin the periodic maintenance. Check for artifacts.

[2] Check for:

- cleanliness
- broken parts
- wear of parts
- leakage
- site specifications

[3] Install new parts for the broken parts and parts that have wear.

Warning
Dangerous Voltage

- Disconnect the main power before lubricating the parts.
- Do not allow any oil or grease to touch the CROSSOVERS and RACK ASSEMBLIES or to drip into the TANKS.

[4] If necessary, provide lubrication.

[5] Use the correct procedure to clean parts.

[6] Make the necessary adjustments.

[7] Process 5 sheets of unprocessed film in the PROCESSOR after you have performed any service. Check for artifacts.

Periodic Maintenance Schedule

ITEM TO CHECK	WEEKLY	MONTHLY	See Service Procedure on Page:
Feed Shelf Alignment		X	2–1
Detector and Crossover Assemblies	X		3–3 and 3–4
Rollers			
Gears			
Guide Shoes			
Bearings			
Brackets			
Nuts			
Rack Assemblies		X	3–5
Rollers			
Gears			
Guide Shoes			

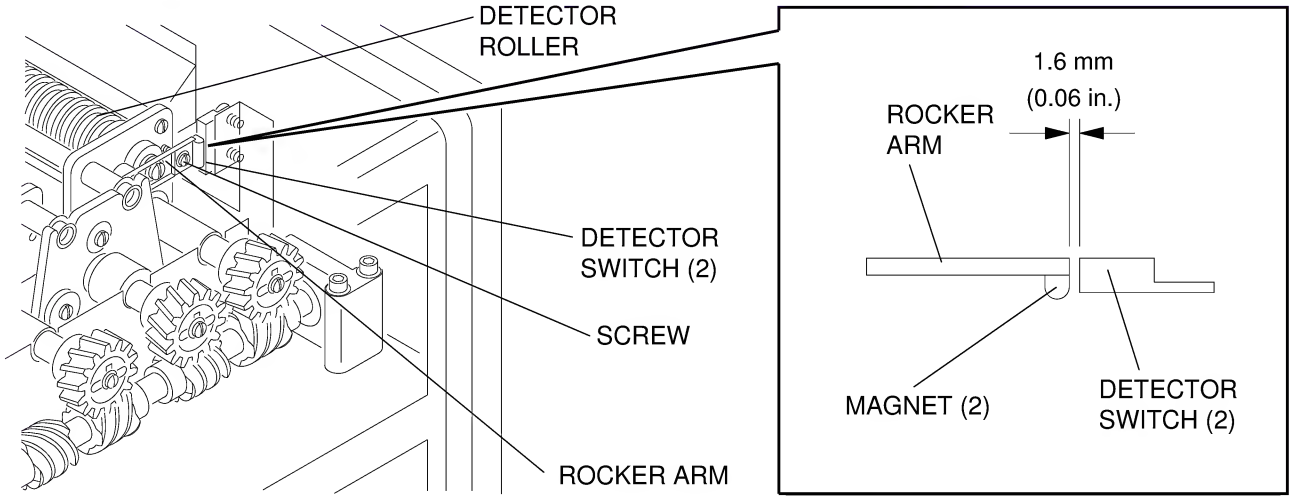
ITEM TO CHECK	WEEKLY	MONTHLY	See Service Procedure on Page:
Bearings			
Chain			
Springs			
Rewet Rollers			
Turnaround Assemblies		X	3–6
Rollers			
Springs			
Main Drive Assembly		X	3–7
Plumbing		X	3–11
Connections			
Tubing			
Recirculation System		X	3–11
Developer Filter		Or after 1000 films	3–12
Developer Temperature	X		3–12
Water Flow to the Processor		X	
Chemical Replenishment	X		3–12
Strainer Assemblies		X	3–12
Dryer Sections			3–8
Bearings		X	
Air Tubes	X		
Rollers		X	
O-Rings		X	
Dryer Temperature	X		
Processor Speeds		X	
EXT			
STD			

Lubrication Table

Part	Lubricant	Frequency	Procedure
Main DRIVE CHAIN	NLGI - No. 2 Lithium Ball and Roller Bearing Grease, TL-2324	As necessary. Check each month.	Apply to surface of Chain.
RECIRCULATION PUMPS	Light oil, such as SAE No. 20 Motor Oil, TL-2244	Every 6 months.	Several drops in the oil holes.
Main DRIVE MOTOR	No lubrication necessary	----	----
GEAR HOUSING of the Main Drive Motor	No lubrication necessary	----	----
BEARINGS in the Dryer Blower Motor	Light oil, such as SAE No. 20 Motor Oil, TL-2244	Every 6 months.	Several drops in the oil holes.

Roller Transport

DETECTOR SWITCHES and DETECTOR CROSSOVER ASSEMBLY



H112_0112BCA
H112_0112BA

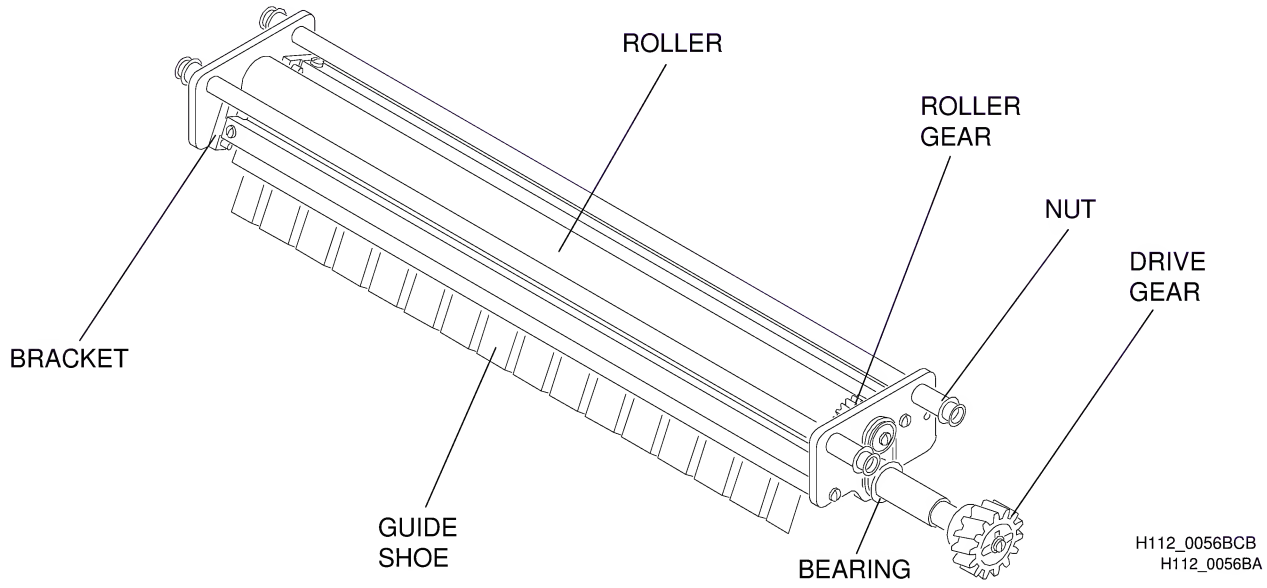
[1] Check that the DETECTOR SWITCHES operate the REPLENISHMENT PUMP. See Page 2–2 for adjustment.

[2] Clean the DETECTOR ROLLERS with a damp, lint-free cloth or natural sponge.

[3] Check:

- That the ROCKER ARM moves freely. If not, remove the ROCKER ARM and BUSHING and clean with warm water.
- For corrosion of the ROCKER ARM. If necessary, install a new ROCKER ARM.
- For squareness of the DETECTOR CROSSOVER ASSEMBLY. See Page 2–4.
- That the DETECTOR CROSSOVER ASSEMBLY is seated correctly.

CROSSOVER ASSEMBLIES



[1] Remove the CROSSOVER ASSEMBLIES from the PROCESSOR.

[2] Rinse the CROSSOVER ASSEMBLIES with running water.

[3] If necessary, use a soft brush and warm water or:

Developer/Fixer Crossover Assembly	Kodak Liquid Developer System Cleaner
Fixer/Wash Crossover Assembly	Kodak Fixer/Wash System Cleaner

[4] Check the ROLLER GEARS for broken or worn teeth. If necessary, install new ROLLERS.

[5] Check that the RESILIENT ROLLER is smooth. If necessary, install a new RESILIENT ROLLER.

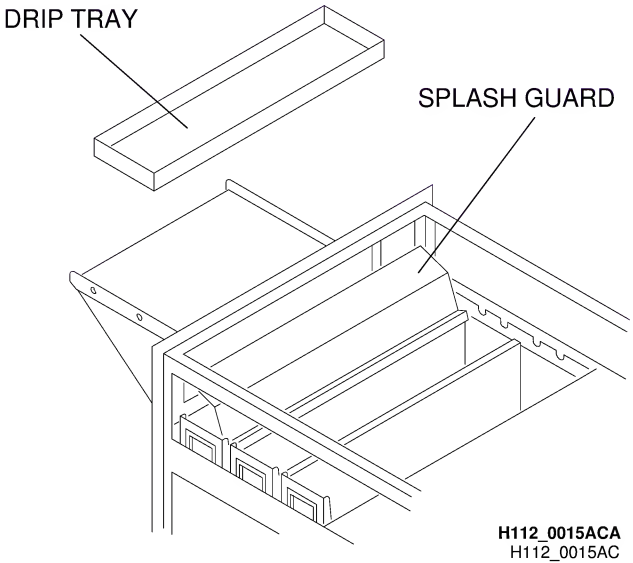
[6] Check the BEARING, BRACKETS, and NUTS for wear or broken parts. If necessary, install new parts.

[7] Check the DRIVE GEAR for wear or burrs. If necessary, install a new DRIVE GEAR.

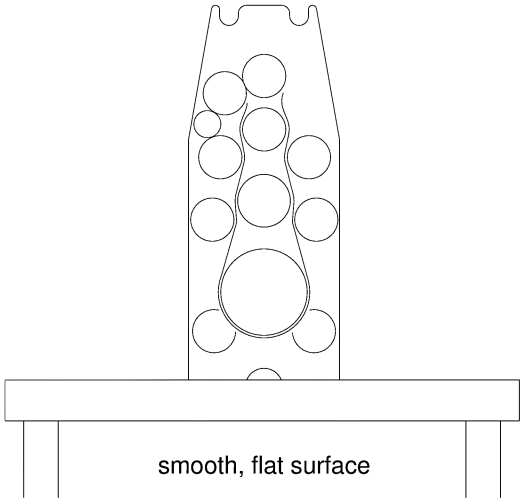
[8] Place the CROSSOVER ASSEMBLIES on a flat surface with the GUIDE SHOES up.

[9] Check for squareness. See Page 2–5 of this manual.

RACK ASSEMBLIES and ROLLERS



H112_0015ACA
H112_0015AC



H112_0110AA

Caution

When you remove the FIXER RACK ASSEMBLY, install a SPLASH GUARD between the DEVELOPER TANK and the FIXER TANK to prevent contamination of the developer. Use a DRIP TRAY when you remove the RACK ASSEMBLIES. Install the RACK ASSEMBLIES slowly into the TANKS.

[1] Remove the RACK ASSEMBLIES from the PROCESSOR.

[2] Rinse the RACK ASSEMBLIES with warm water, approximately 44°C (110°F).

Note

Discoloration of the ROLLERS is normal.

[3] If necessary, use a soft brush or:

Assembly	Use:
Developer Rack Assembly	Kodak Liquid Developer System Cleaner
Fixer Rack Assembly or Wash Rack Assembly	Kodak Fixer/Wash System Cleaner

[4] Remove the STUDS from the drive side.

[5] Remove all the OUTER ROLLERS on the entrance side except the bottom OUTER ROLLER.

[6] Clean the INNER and OUTER ROLLERS.

[7] Check all SPROCKETS and GEARS for wear.

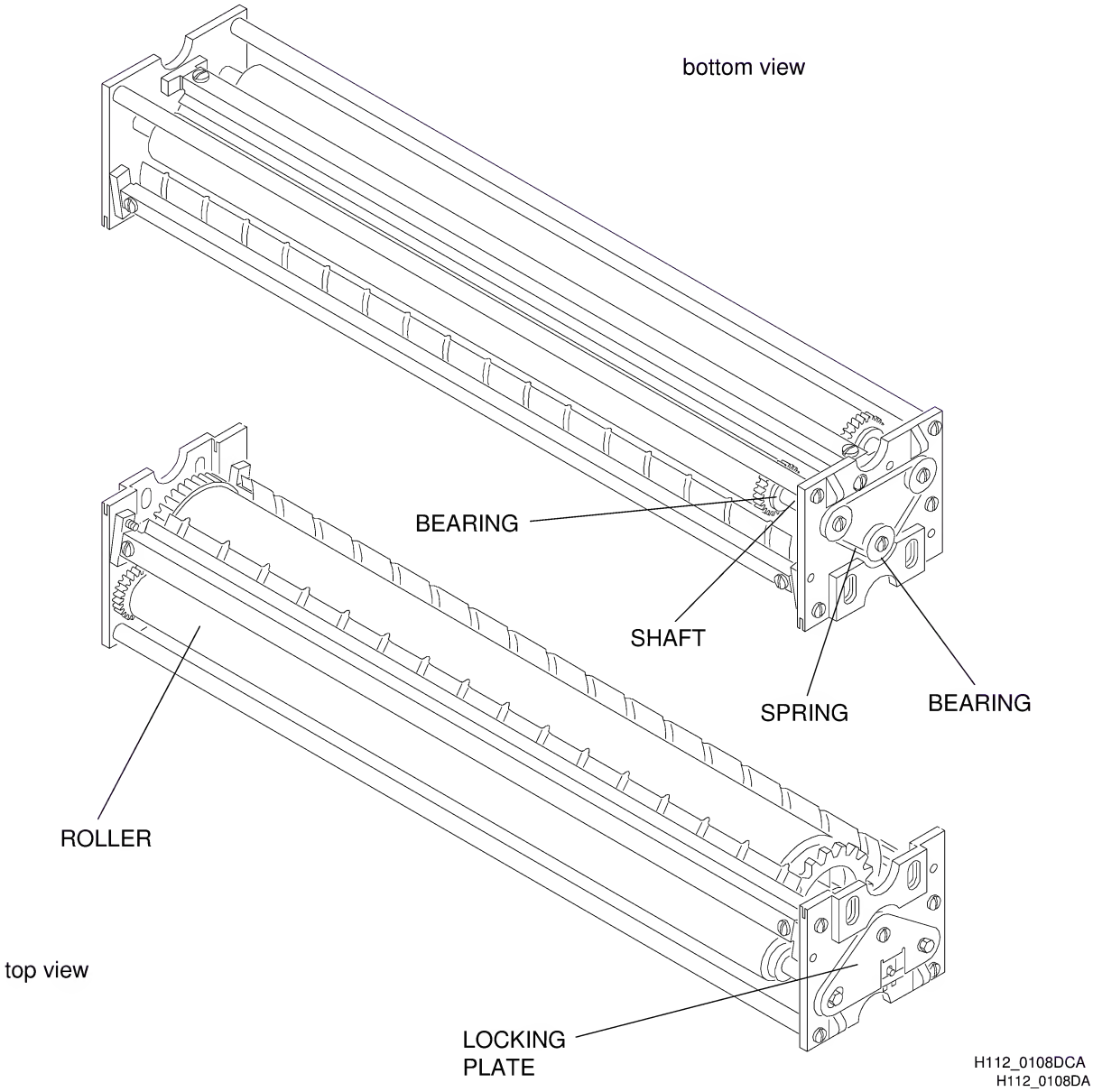
[8] Check that all ROLLERS are straight.

[9] Install the ROLLERS in the RACK ASSEMBLY.

[10] Check:

- That the ROLLERS are installed correctly.
- The REWET ROLLER for wear.
- That the REWET ROLLER is smooth.
- That the REWET ROLLER touches the ROLLERS above and below it.
- The RACK ASSEMBLY for squareness. See Page 2–4.

TURNAROUND ASSEMBLIES



[1] Remove the TURNAROUND ASSEMBLIES from the RACK ASSEMBLIES.

[2] Clean the DEVELOPER TURNAROUND ASSEMBLY with *Kodak* Liquid Developer System Cleaner.

[3] Clean the FIXER TURNAROUND ASSEMBLY with *Kodak* Liquid Fixer/Wash System Cleaner.

[4] Check the tension of the SPRINGS. If necessary, install new SPRINGS.

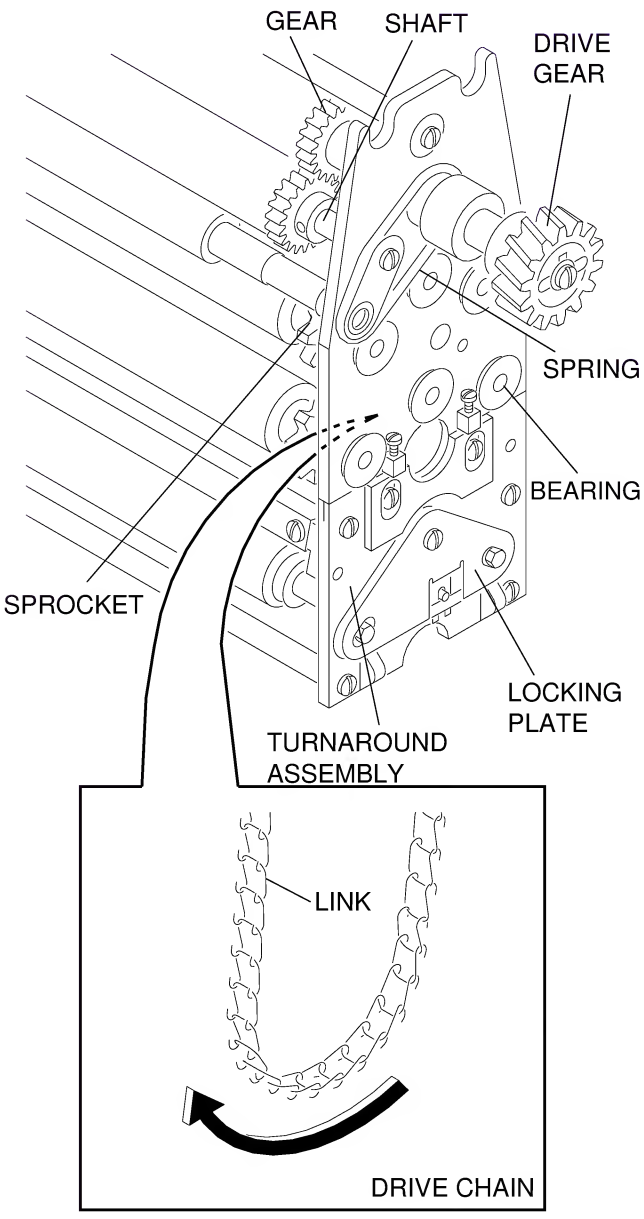
[5] Check the BEARINGS. If a ROLLER does not rotate freely on the SHAFT, install new BEARINGS.

[6] Check that the ROLLERS move freely in the slots of the LOCATING PLATES.

[7] Check that the surfaces of the ROLLERS are smooth.

[8] Wipe all ROLLERS with a damp cloth or sponge.

DRIVE CHAIN and SPRINGS



H112_0109CCB
H112_0109CA

[1] Manually rotate the DRIVE GEAR to check the LINKS of the DRIVE CHAIN.

[2] Check the tension of the DRIVE CHAIN.

Important

If the DRIVE CHAIN is too tight, the ROLLERS will bind and cause wear to the BEARINGS. If the DRIVE CHAIN is too loose, the ROLLERS will not move smoothly.

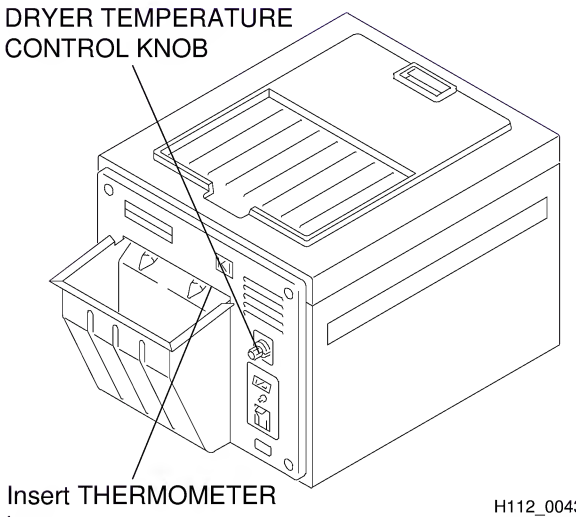
[3] If necessary, adjust the DRIVE CHAIN. See Page 2–6.

Note

If you adjust the DRIVE CHAIN, adjust both sides of the TURNAROUND ASSEMBLY by the same distance.

[4] Check the SPRINGS for wear. If necessary, install new SPRINGS.

DRYER



H112_0043ACC
H112_0043AC

[1] Check that all ROLLERS rotate freely.

[2] Check for broken GEARS. If necessary, install new ROLLERS.

[3] Remove dirt and dust from the AIR TUBES.

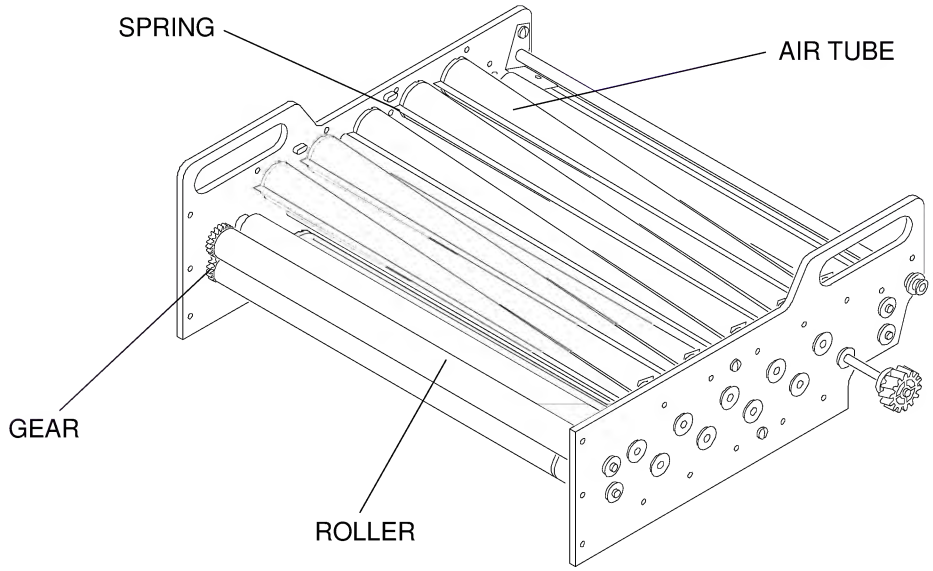
[4] Check the SPRINGS, not shown, for wear. If necessary, install new SPRINGS.

[5] Check the temperature at the bottom of the DRYER on the drive side of the PROCESSOR.

[6] If necessary, turn the DRYER TEMPERATURE CONTROL KNOB to adjust the temperature. See Page 2–24.

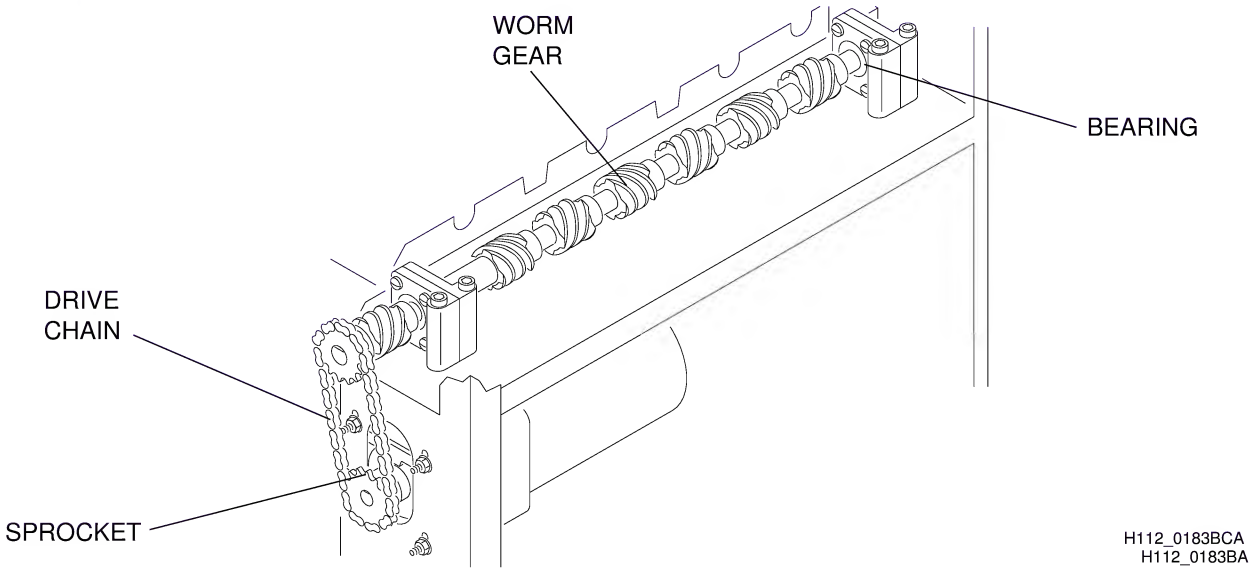
Note

The temperature of the DRYER should be as low as possible for drying the film.



H112_0095BCA
H112_0095BA

Main Drive



[1] Check the DRIVE CHAIN for wear. If necessary, install a new DRIVE CHAIN. See Page 2–6.

[2] Check the tension of the DRIVE CHAIN. See Page 2–6 if adjustment is necessary.

[3] If necessary, lubricate the DRIVE CHAIN.

[4] Check the BEARINGS, SPROCKETS, and WORM GEARS for wear. If necessary, install new parts.

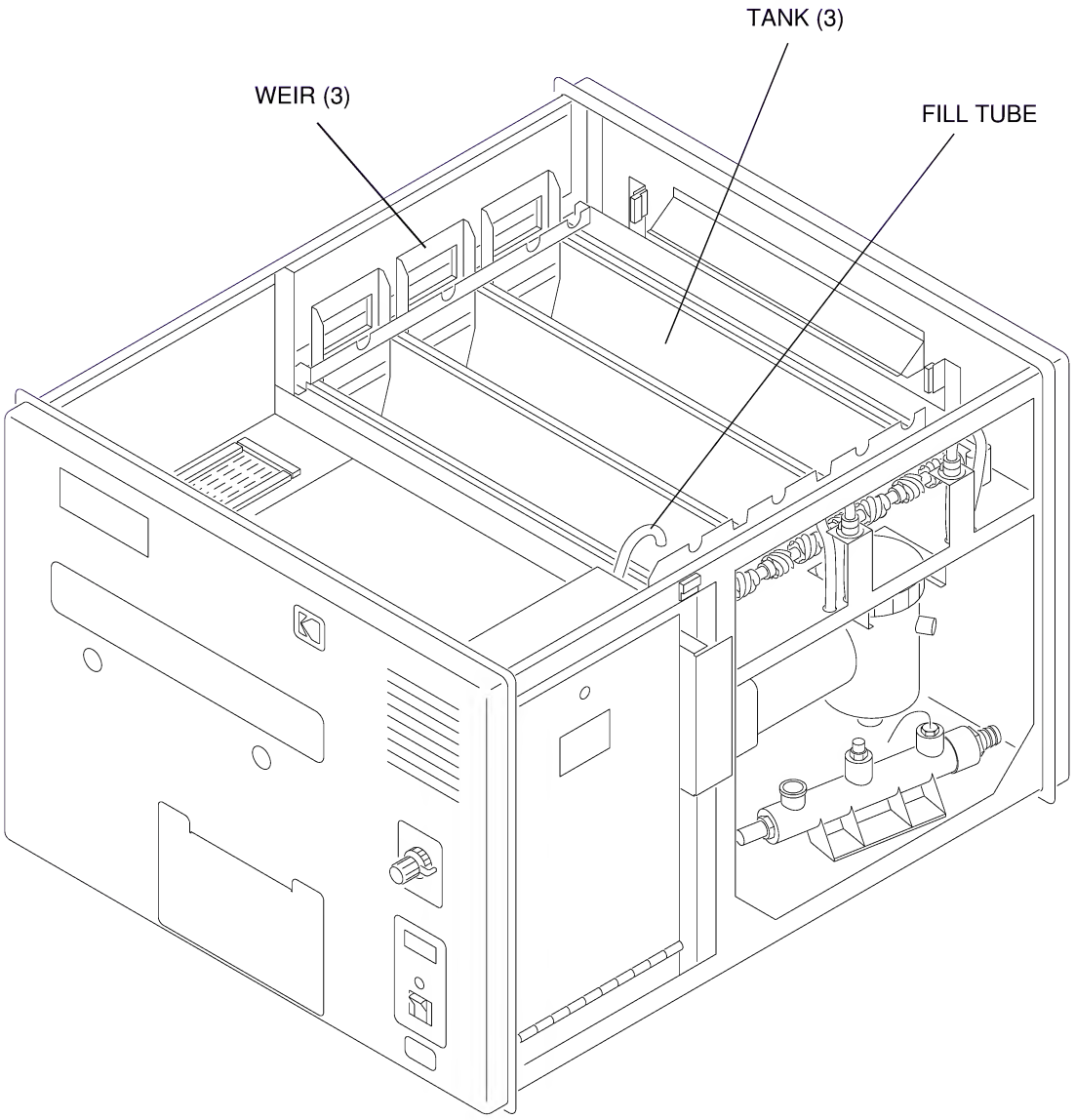
[5] Check the teeth of the SPROCKETS. If the teeth are sharp, install new SPROCKETS.

[6] Check the WORM GEARS for burrs. If necessary, install new WORM GEARS.

[7] Rinse the WORM GEARS with a small amount of warm water.

Plumbing

General



H112_0154DCB
H112_0154DA

[1] Check all the CONNECTIONS to the RECIRCULATION PUMPS, the VALVES, TUBING, and TANKS for leakage.

[2] Check that the temperature of the incoming water is 4 - 30°C (40 - 85°F).

[3] Check the flow rate of the wash water.

(a) Drain the TANKS.

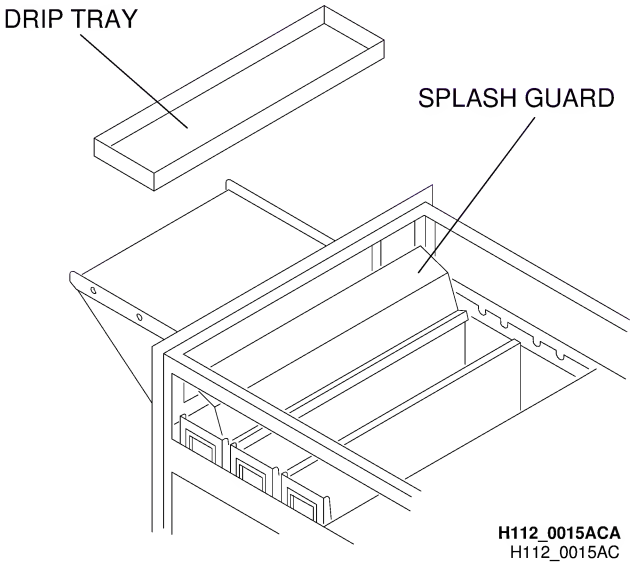
(b) Remove:

- FIXER/WASH CROSSOVER ASSEMBLY
- DRYER RACK ASSEMBLY
- WASH RACK ASSEMBLY

(c) Turn on the water.

(d) Measure the flow rate of the water. It should be 946 mL/min (¼ gal/min), +10% -0%, from the water FILL TUBE.

RECIRCULATION PUMPS



H112_0015ACA
H112_0015AC

Note

When doing periodic maintenance and when changing the processing solutions, check the RECIRCULATION PUMPS and tubing.

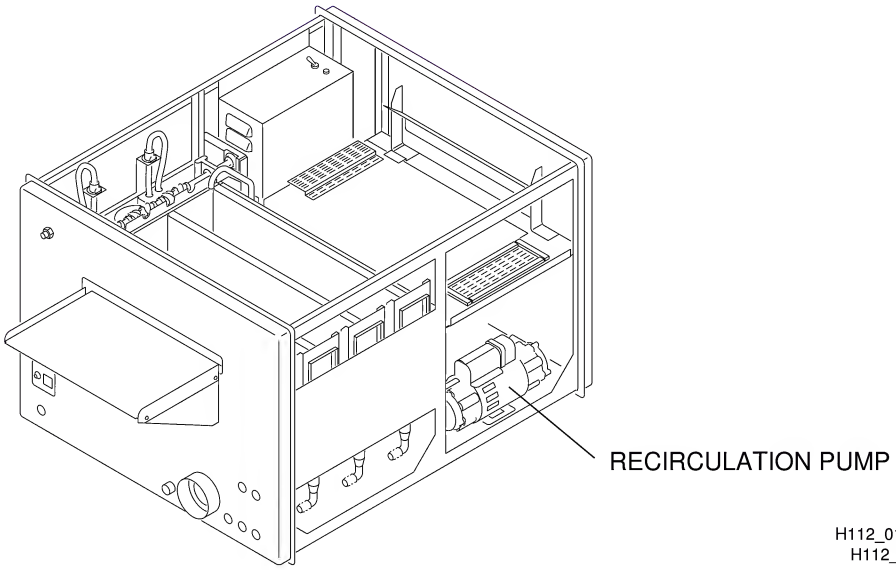
Caution

- Always use a DRIP TRAY and the SPLASH GUARD when you remove RACK ASSEMBLIES.
- Never operate the RECIRCULATION PUMPS if the TANKS are empty.

[1] Actuate the RECIRCULATION PUMPS.

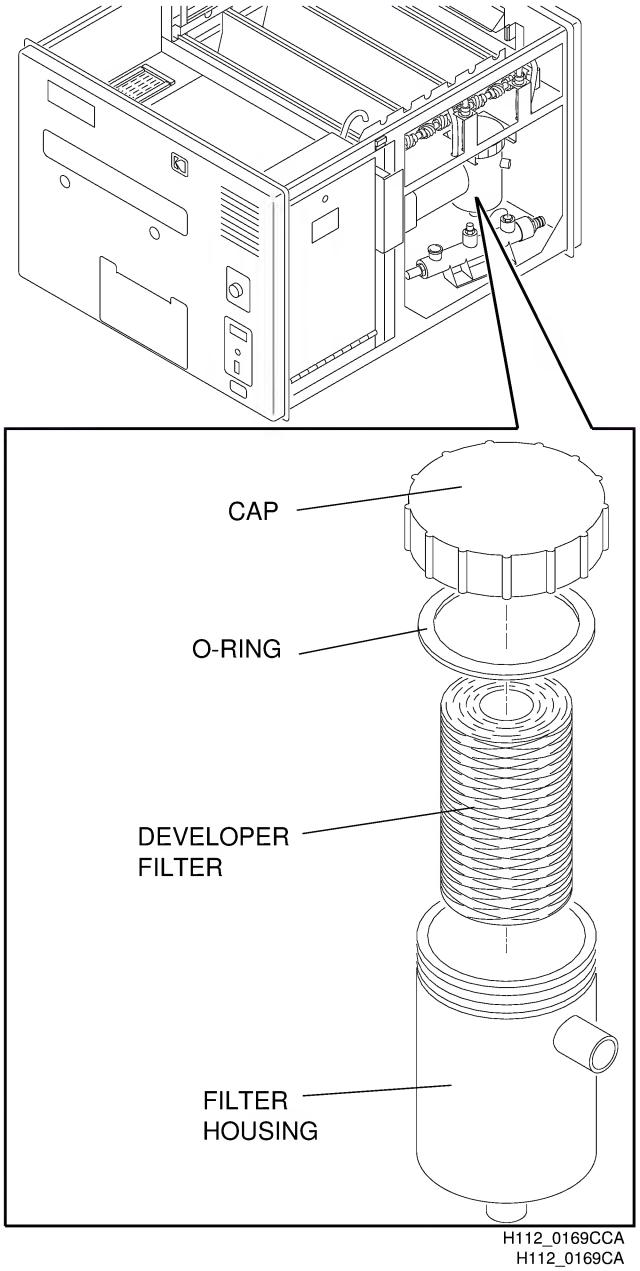
[2] Check for:

- agitation on the surface of the solutions
- leakage
- excessive noise in the RECIRCULATION PUMPS



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H112_0166BA

DEVELOPER FILTER and Temperataure



H112_0169CCA
H112_0169CA

[1] Install a new DEVELOPER FILTER at least once a month or after approximately 1000 sheets of film.

[2] Check that the O-RING is correctly seated before you install the CAP.

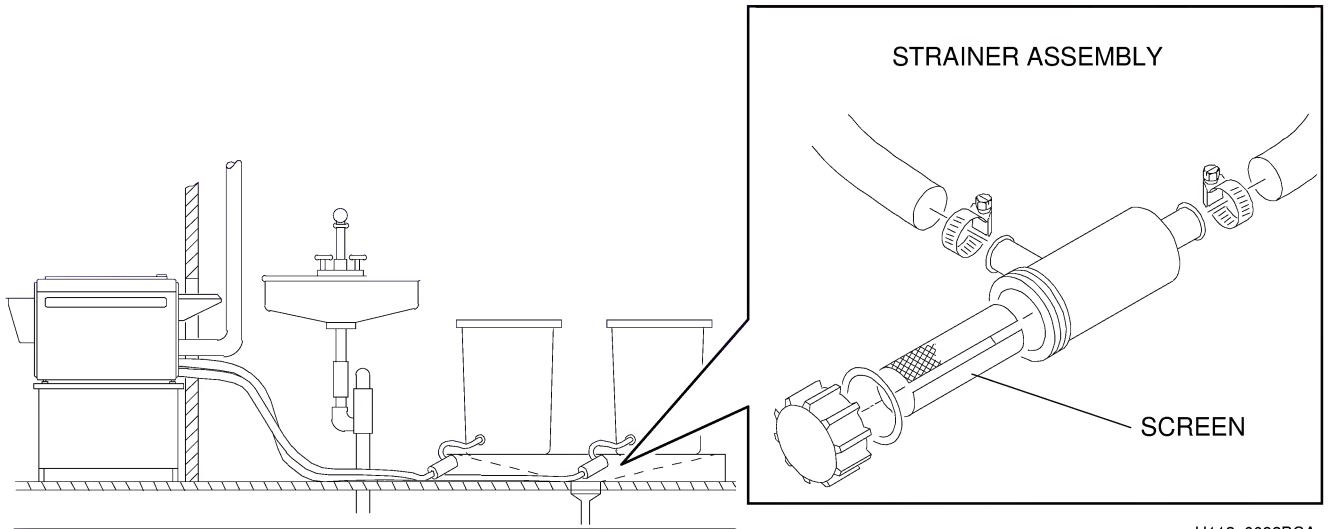
[3] Check the temperature of the developer. If necessary, adjust R301 or R302. See Page 2–29.

Chemical Replenishment

[1] Check the replenishment flow rates by doing the procedure on Page 2–46.

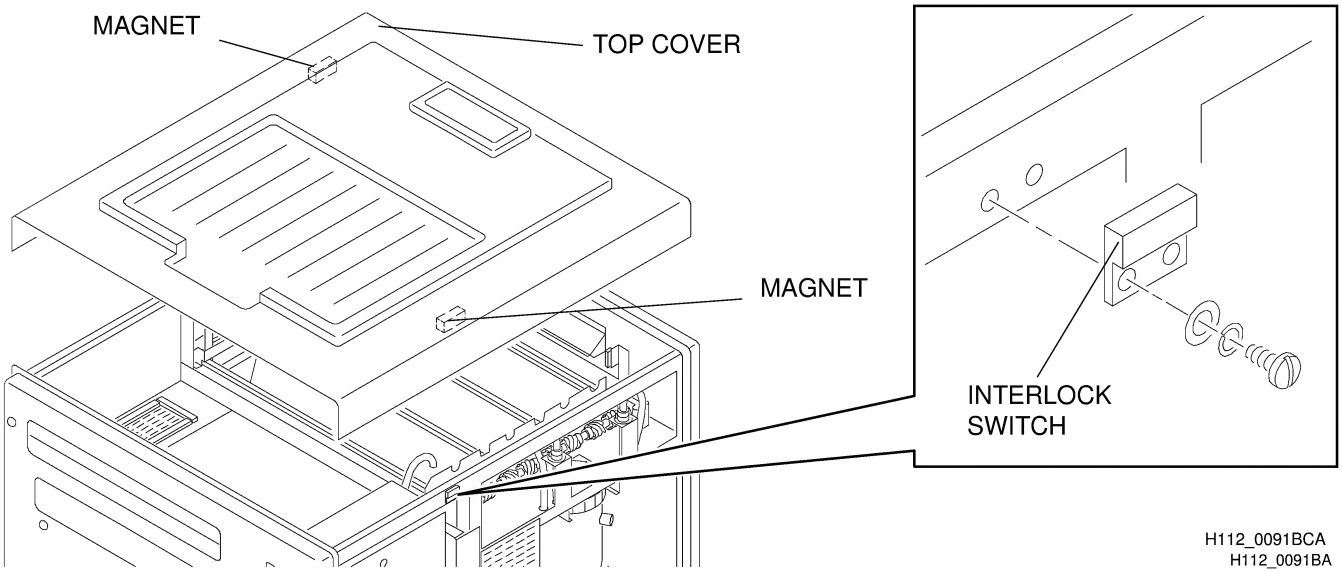
[2] Check the STRAINERS for debris.

- **(a)** Place CLAMPS on the tubing to stop the replenishment flow.
- **(b)** Disassemble the STRAINER ASSEMBLIES.
- **(c)** Use a brush and warm water to clean the STRAINER ASSEMBLIES and to remove dirt and chemical deposits from the SCREENS.



H112_0092BCA
H112_0092BA

INTERLOCK SWITCH



H112_0091BCA
H112_0091BA

[1] Check the operation of the INTERLOCK SWITCH:

- **(a)** Press one of the RUN/STANDBY SWITCHES.
- **(b)** Remove the TOP COVER. The MAIN DRIVE MOTOR, the BLOWER MOTOR, and the DRYER HEATER will stop.
- **(c)** If the DRYER HEATER does not stop, adjust the position of the MAGNETS on the TOP COVER.
- **(d)** Install the TOP COVER and do Steps (a) - (c) again.

[2] If the MAIN DRIVE MOTOR, the BLOWER MOTOR, and the DRYER HEATER do not stop, install a new INTERLOCK SWITCH.

Section 4: Correcting Difficulties

Important

- Many film transport and sensitometric difficulties can be caused or aggravated by inadequate hardening of the emulsion due to underreplenishment of the developer and fixer solution.
- Another cause of inadequate hardening of the emulsion may be deterioration of the developer replenisher because of age or storage at too high a temperature. Do not mix more than a 2-week supply of developer replenisher.

1. Transport Failure	2. Surface Artifacts	3. Abnormal Film Densities	4. Wet Films	5. Low Solution Levels	6. Overlapping of Films	
1	2	3	4	5	6	
•					•	Film Feeding Error **Feed only single thicknesses of film. Feed the next film only after the film feed signal sounds. If there is no film feed signal, refer the difficulty to qualified personnel.**
•	•	•	•			Feed only compatible films.
•					•	Check that all Racks and Crossovers are seated correctly.
•	•					Check that the surfaces of all the Rollers are clean and smooth, especially in the developer Turnaround Assembly.
•			•			Check that the Dryer Air Tubes are in the correct positions.
	•		•			Remove any dirt from the Dryer Rollers and Air Tubes, especially the slots. Use a bottle brush and rinse with water.
	•	•	•	•		Check the settings for correct replenishment. Check the replenishment system: Tubing kinks, Pump operation, Detector Switches, and Replenishment Pump.
	•					Adjust the Dryer temperature control setting to the lowest possible temperature that still allows good drying.
	•					Clean the Feed Shelf and Detector Rollers.
•	•				•	Clean any biological growth in the wash Tank with a mild solution of chlorine bleach. Use 60 mL (2 fluidounces) of bleach per 3.8 L (1 gallon) of water. Wipe the Tanks with a soft sponge.
•				•		Check that the Weirs are seated correctly. Check that the Tanks are full.
•	•	•	•		•	Change any chemicals that were not mixed correctly, are exhausted, or are contaminated. Change the Developer Filter if necessary. Check that replenishment flow rates are correctly set. If necessary, fill the Replenishment Tanks. **Mix the developer replenishment in quantities not to exceed a 2-week supply.** **Always use a Splash Guard and Rack Drip Tray when lifting the fixer Rack to prevent contaminating the developer.** **Mix chemicals as directed.**

1. Transport Failure	2. Surface Artifacts	3. Abnormal Film Densities	4. Wet Films	5. Low Solution Levels	6. Overlapping of Films	
1	2	3	4	5	6	
•	•				•	Check that all Rollers are in place and positioned and rotating correctly.
•	•				•	Check that all Roller Gears, Sprockets, and Idlers are engaged.
•	•				•	Replace any Rollers that have broken or worn Gudgeons.
•	•				•	Replace any Bearings that do not allow the Turnaround Rollers to rotate correctly.
•	•					Check the tension on the Rack Chain. Check that the Rollers do not hesitate and that the Chain moves smoothly.
		•				With the Processor on, check for movement on the surface of the solutions. Movement indicates recirculation. If you do not observe any movement, check that the Tubing is not kinked, that the Recirculation Pump is operating, and that the Developer Filter is clean and in position.
•	•					If the incoming wash water is dirty, clean the Rack and Tank thoroughly. Change the incoming water Filter. Make sure to use the correct water Filter.
				•		Check that the Poppets in the Replenishment Pump are clean and are not distorted or worn. If the Poppets are preventing proper replenishment, have qualified personnel clean or replace them.
			•			Check that the Dryer air exhaust is free from any obstruction and is installed correctly according to specifications in the Installation Instructions.
•					•	Check that the Turnaround Assemblies are adjusted correctly. Make sure that the Turnaround Assemblies are square with the Racks.
	•	•				Check the incoming water temperature. Temperature must be between 4˚C (40˚F) and 30˚C (85˚F).
•						Check that the Orifices in the developer and fixer recirculation lines are the correct size and are not plugged.
		•				Check that the correct Bulb and Safelight Filter are in the Safelight and at the correct distance from the Feed Shelf and work surface.
•		•				Check that the Top Cover and Panels are tight on the Processor. Check that there are no leaks in the Lighttight Gasket.
•						10 x 10 cm films - feed films diagonally if they fail to transport reliably.
					•	Check the time delay. For all transport speeds, the Buzzer should sound once the trailing edge of the film has advanced 75 mm (3 in.) into the Processor.
•	•	•			•	Check that the solution levels in the Tanks are at the overflow Weirs.
•	•					Adjust the Guide Shoes correctly. NOTE: Most often in the developer Turnaround Assembly. Adjust the long edges of the Guide Shoes in the exit Turnaround Assembly as close as possible to the Rack Roller above them.
				•		Check for solution in the Replenishment Tanks. Fill if necessary. NOTE: Mix developer replenisher in quantities not to exceed a 2-week supply.
		•				Check that the correct Bulb is in the Safelight.

1. Transport Failure	2. Surface Artifacts	3. Abnormal Film Densities	4. Wet Films	5. Low Solution Levels	6. Overlapping of Films	
1	2	3	4	5	6	
		•				With a thermometer of known accuracy, check that the temperature of the developer is correct for the mode selected -- Standard or Extended. If necessary, have qualified personnel make adjustments. NOTE: Check the incoming water temperature. It must be a minimum of 4˚C (7˚F) lower than the desired developer temperature.
•						If the digital temperature display is blank and all noise ceases, including the Main Drive Motor and the ventilation Fan: Turn off the main power and the main power switch on the Processor. Remove the drive Side Panel. Open the Electrical Box Cover. Check the Fuse. If necessary, install a new Fuse, making certain to match the size and type of the existing one.
	•	•				Check that the film is compatible with the selected mode, Standard or Extended.

Section 5: Diagrams

Table of Contents

Description	Page
Circuit Diagrams	5-2
Wiring Diagrams	5-8
Sequence of Operation	5-11
Diagnostic Flowcharts	5-15

Note

If the PROCESSOR does not operate correctly after checking through the table starting on Page 4–1 of this Service Manual, see the diagrams in this section.

System	Condition	Description	Page No.
Dryer Temperature Control or Main Drive		Sequence of Operation, Figure No. 5-10 Circuit Diagram, 800 Board, Figure No. 5-1 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2	5–13 5–2 5–4 5–3
	No Blower Motor or Drive Motor	Diagnostic Flowchart, Figure No. 5-14 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2	5–17 5–4 5–3
	No Drive Motor or Dryer Heat	Circuit Board Flowchart, M35A-M, Fig No. 5-19 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2	5–24 5–4 5–3
	No Dryer Heat	Diagnostic Flowchart, M35-M, Figure No. 5-16 Diagnostic Flowchart, M35A-M, Figure No. 5-15	5–19 5–18
	No Blower Motor	Diagnostic Flowchart, Figure No. 5-13	5–16
Replenishment Control System		Sequence for Film Feeding, Figure No. 5-20 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2	5–26 5–4 5–3
	No Replenishment Pump	Diagnostic Flowchart, Figure No. 5-20	5–26
Developer Temperature		Sequence of Operation, Figure No. 5-11 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2	5–14 5–4 5–3
	No Developer Heat	Diagnostic Flowchart, M35-M, Figure No. 5-18 Diagnostic Flowchart, M35A-M, Figure No. 5-17	5–22 5–20
	Developer Heat on All the Time	Diagnostic Flowchart, Figure No. 5-12	5–15
Complete Processor		Sequence of Operation, Figure No. 5-8 Sequence of Operation, Film Feeding, Fig No. 5-9 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2 Wiring Diagram, M35-M, Figure No. 5-6 Wiring Diagram, M35A-M, Figure No. 5-5 Wiring Diagram, M35A-M Control Box, Figure No. 5-7 Circuit Diagram, 100 Board, Figure No. 5-4	5–11 5–12 5–4 5–3 5–9 5–8 5–10 5–6

Section 5: Diagrams

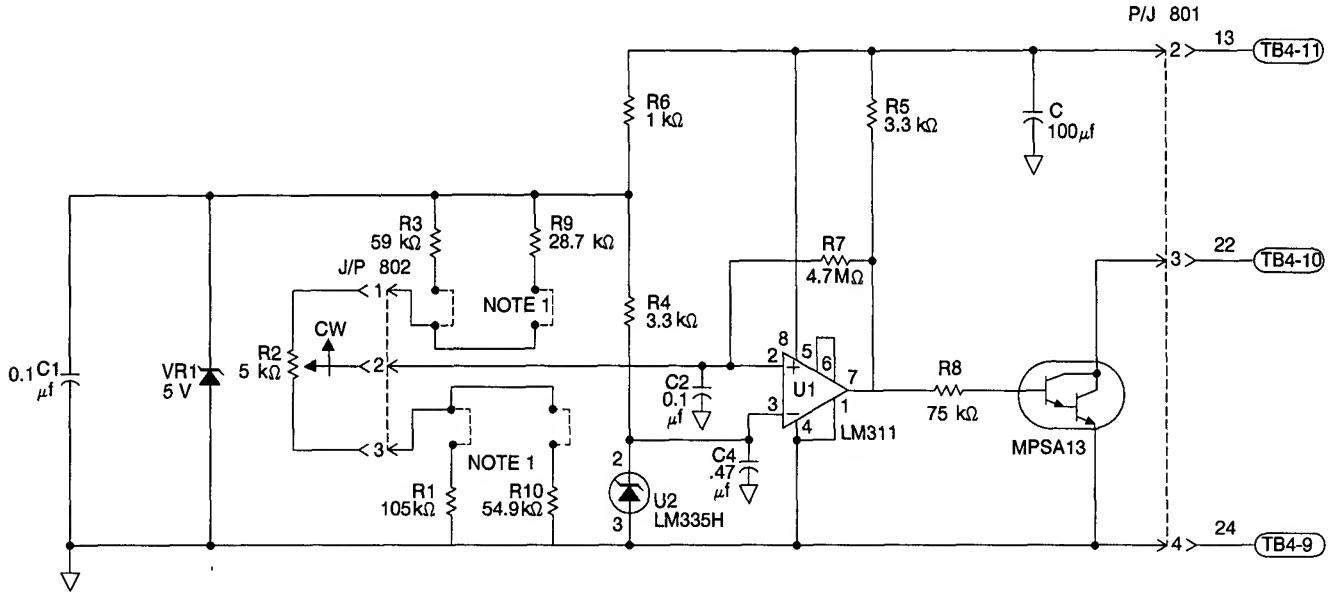
Table of Contents

Description	Page
Circuit Diagrams	5-2
Wiring Diagrams	5-8
Sequence of Operation	5-11
Diagnostic Flowcharts	5-15

Note

If the PROCESSOR does not operate correctly after checking through the table starting on Page 4–1 of this Service Manual, see the diagrams in this section.

System	Condition	Description	Page No.
Dryer Temperature Control or Main Drive		Sequence of Operation, Figure No. 5-10 Circuit Diagram, 800 Board, Figure No. 5-1 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2	5–13 5–2 5–4 5–3
	No Blower Motor or Drive Motor	Diagnostic Flowchart, Figure No. 5-14 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2	5–17 5–4 5–3
	No Drive Motor or Dryer Heat	Circuit Board Flowchart, M35A-M, Fig No. 5-19 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2	5–24 5–4 5–3
	No Dryer Heat	Diagnostic Flowchart, M35-M, Figure No. 5-16 Diagnostic Flowchart, M35A-M, Figure No. 5-15	5–19 5–18
	No Blower Motor	Diagnostic Flowchart, Figure No. 5-13	5–16
Replenishment Control System		Sequence for Film Feeding, Figure No. 5-20 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2	5–26 5–4 5–3
	No Replenishment Pump	Diagnostic Flowchart, Figure No. 5-20	5–26
Developer Temperature		Sequence of Operation, Figure No. 5-11 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2	5–14 5–4 5–3
	No Developer Heat	Diagnostic Flowchart, M35-M, Figure No. 5-18 Diagnostic Flowchart, M35A-M, Figure No. 5-17	5–22 5–20
	Developer Heat on All the Time	Diagnostic Flowchart, Figure No. 5-12	5–15
Complete Processor		Sequence of Operation, Figure No. 5-8 Sequence of Operation, Film Feeding, Fig No. 5-9 Circuit Diagram, M35-M, Figure No. 5-3 Circuit Diagram, M35A-M, Figure No. 5-2 Wiring Diagram, M35-M, Figure No. 5-6 Wiring Diagram, M35A-M, Figure No. 5-5 Wiring Diagram, M35A-M Control Box, Figure No. 5-7 Circuit Diagram, 100 Board, Figure No. 5-4	5–11 5–12 5–4 5–3 5–9 5–8 5–10 5–6



NOTE 1: JUMPERS R9 AND R10 FOR M35 AND M35-M OPERATION.
JUMPERS R1 AND R3 FOR M35A AND M35A-M OPERATION.
(JUMPERS SET POT RANGE TO MATCH DRYER HEATERS, 120 V ac vs. 240 V ac)

POT	M35
MINIMUM	100°F or 38°C
MAXIMUM	125°F or 52°C

H112_0000HC_

Figure 5-1 Circuit Diagram — Dryer Temperature Control, 800 Circuit Board — for the M35-M and M35A-M Processors

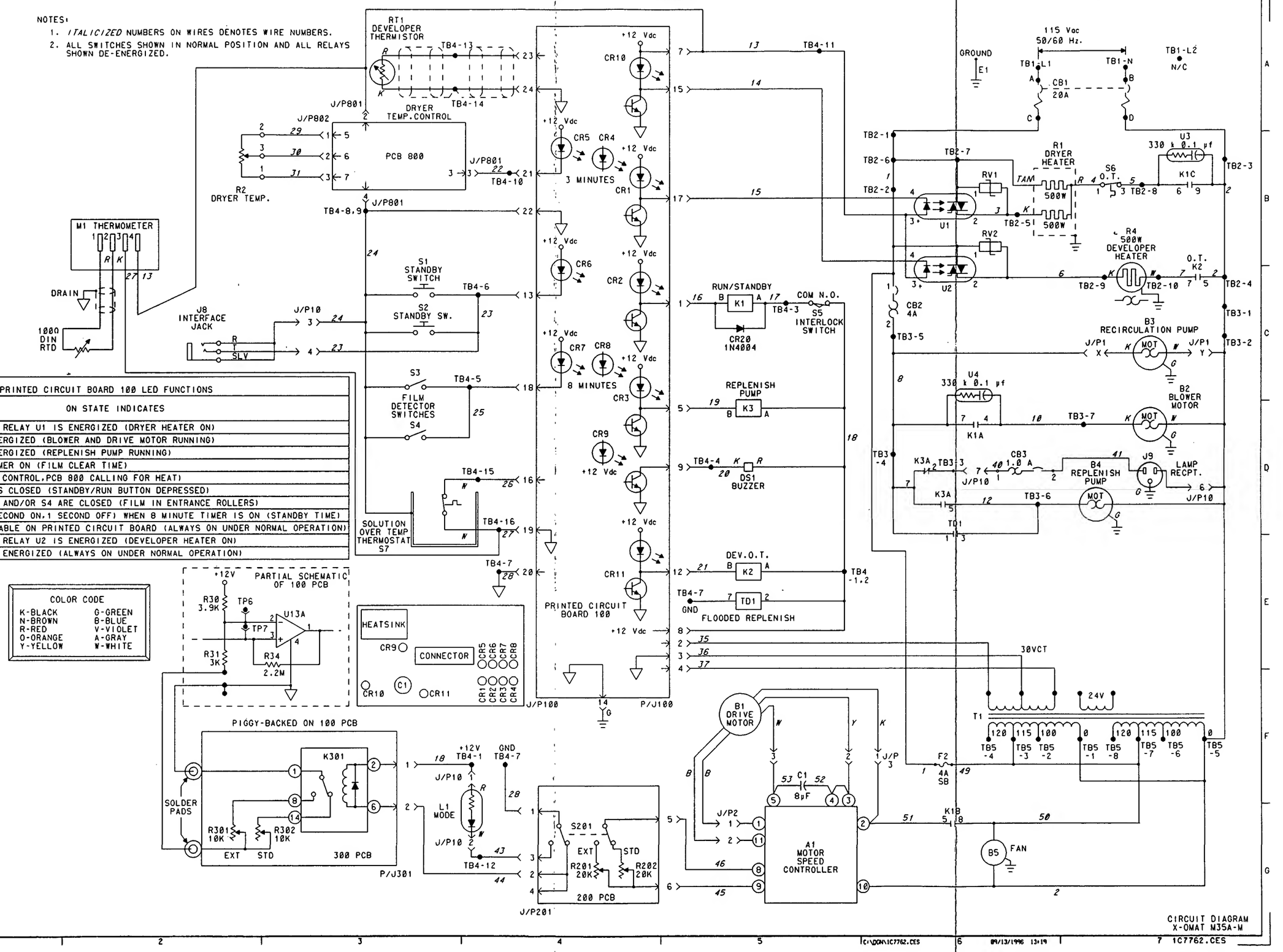
NOTES:

1. *ITALICIZED* NUMBERS ON WIRES DENOTES WIRE NUMBERS.
2. ALL SWITCHES SHOWN IN NORMAL POSITION AND ALL RELAYS SHOWN DE-ENERGIZED.

PRINTED CIRCUIT BOARD 100 LED FUNCTIONS	
LED DESIGNATION	ON STATE INDICATES
CR1	SOLID STATE RELAY U1 IS ENERGIZED (DRYER HEATER ON)
CR2	RELAY K1 ENERGIZED (BLOWER AND DRIVE MOTOR RUNNING)
CR3	RELAY K3 ENERGIZED (REPLENISH PUMP RUNNING)
CR4	3 MINUTE TIMER ON (FILM CLEAR TIME)
CR5	(DRYER TEMP CONTROL, PCB 800 CALLING FOR HEAT)
CR6	SWITCH S6 IS CLOSED (STANDBY/RUN BUTTON DEPRESSED)
CR7	SWITCHES S3 AND/OR S4 ARE CLOSED (FILM IN ENTRANCE ROLLERS)
CR8	BLINKS (1 SECOND ON, 1 SECOND OFF) WHEN 8 MINUTE TIMER IS ON (STANDBY TIME)
CR9	12 Vdc AVAILABLE ON PRINTED CIRCUIT BOARD (ALWAYS ON UNDER NORMAL OPERATION)
CR10	SOLID STATE RELAY U2 IS ENERGIZED (DEVELOPER HEATER ON)
CR11	RELAY K2 IS ENERGIZED (ALWAYS ON UNDER NORMAL OPERATION)

COLOR CODE

K-BLACK	G-GREEN
N-BROWN	B-BLUE
R-RED	V-VIOLET
O-ORANGE	A-GRAY
Y-YELLOW	W-WHITE



CIRCUIT DIAGRAM
X-OMAT M35A-M

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Figure 5-2 Circuit Diagram for the Complete M35A-M Processor

NOTES:

1. TRANSFORMER T1 INPUT VOLTAGE (MOVE WIRE #49 AND JUMPER TB5 AS INDICATED.) TRANSFORMER SHOWN WIRED FOR 220V 50/60HZ AS SHIPPED FROM FACTORY.

INPUT VOLTAGE	WIRE #49 TO	TB5 JUMPER
200V OR 208V 50/60HZ	TB5-2	TB5-1 TO TB5-6
220V 50/60HZ	TB5-2	TB5-1 TO TB5-8
240V 50/60HZ	TB5-4	TB5-1 TO TB5-8

2. WHEN SPLITTING LOADS, REMOVE METAL JUMPER FROM TB2-6 TO TB2-7.
3. ------ DENOTES WIRING WHICH CHANGES IN ACCORDANCE WITH POWER SERVICE USED.
4. *ITALICIZED* NUMBERS ON WIRES DENOTES WIRE NUMBERS.
5. ALL SWITCHES SHOWN IN NORMAL POSITION AND ALL RELAYS SHOWN DE-ENERGIZED.

COLOR CODE

K-BLACK	G-GREEN
N-BROWN	B-BLUE
R-RED	V-VIOLET
O-ORANGE	A-GRAY
Y-YELLOW	W-WHITE

PRINTED CIRCUIT BOARD 100 LED FUNCTIONS	
LED DESIGNATION	ON STATE INDICATES
CR1	SOLID STATE RELAY U1 IS ENERGIZED (DRYER HEATER ON)
CR2	RELAY K1 ENERGIZED (BLOWER AND DRIVE MOTOR RUNNING)
CR3	RELAY K3 ENERGIZED (REPLENISH PUMP RUNNING)
CR4	3 MINUTE TIMER ON (FILM CLEAR TIME)
CR5	(DRYER TEMP CONTROL, PCB 800 CALLING FOR HEAT)
CR6	SWITCH S6 IS CLOSED (STANDBY/RUN BUTTON DEPRESSED)
CR7	SWITCHES S3 AND/OR S4 ARE CLOSED (FILM IN ENTRANCE ROLLERS)
CR8	BLINKS (1 SECOND ON, 1 SECOND OFF) WHEN 8 MINUTE TIMER IS ON (STANDBY TIME)
CR9	12 Vdc AVAILABLE ON PRINTED CIRCUIT BOARD (ALWAYS ON UNDER NORMAL OPERATION)
CR10	SOLID STATE RELAY U2 IS ENERGIZED (DEVELOPER HEATER ON)
CR11	RELAY K2 IS ENERGIZED (ALWAYS ON UNDER NORMAL OPERATION)

5-4 **Figure 5-3 Circuit Diagram for the Complete M35-M Processor, Sheet 1 of 2**

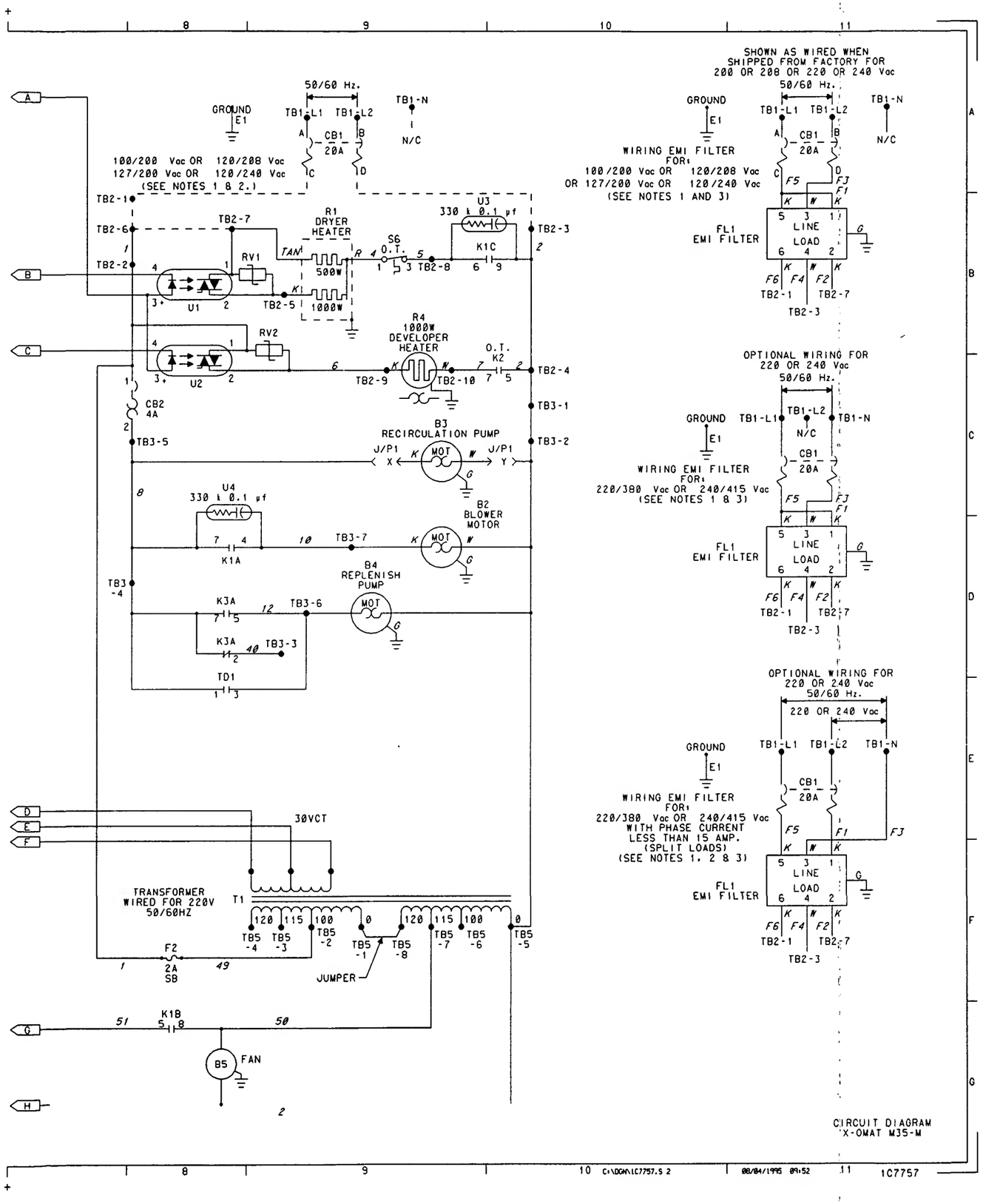
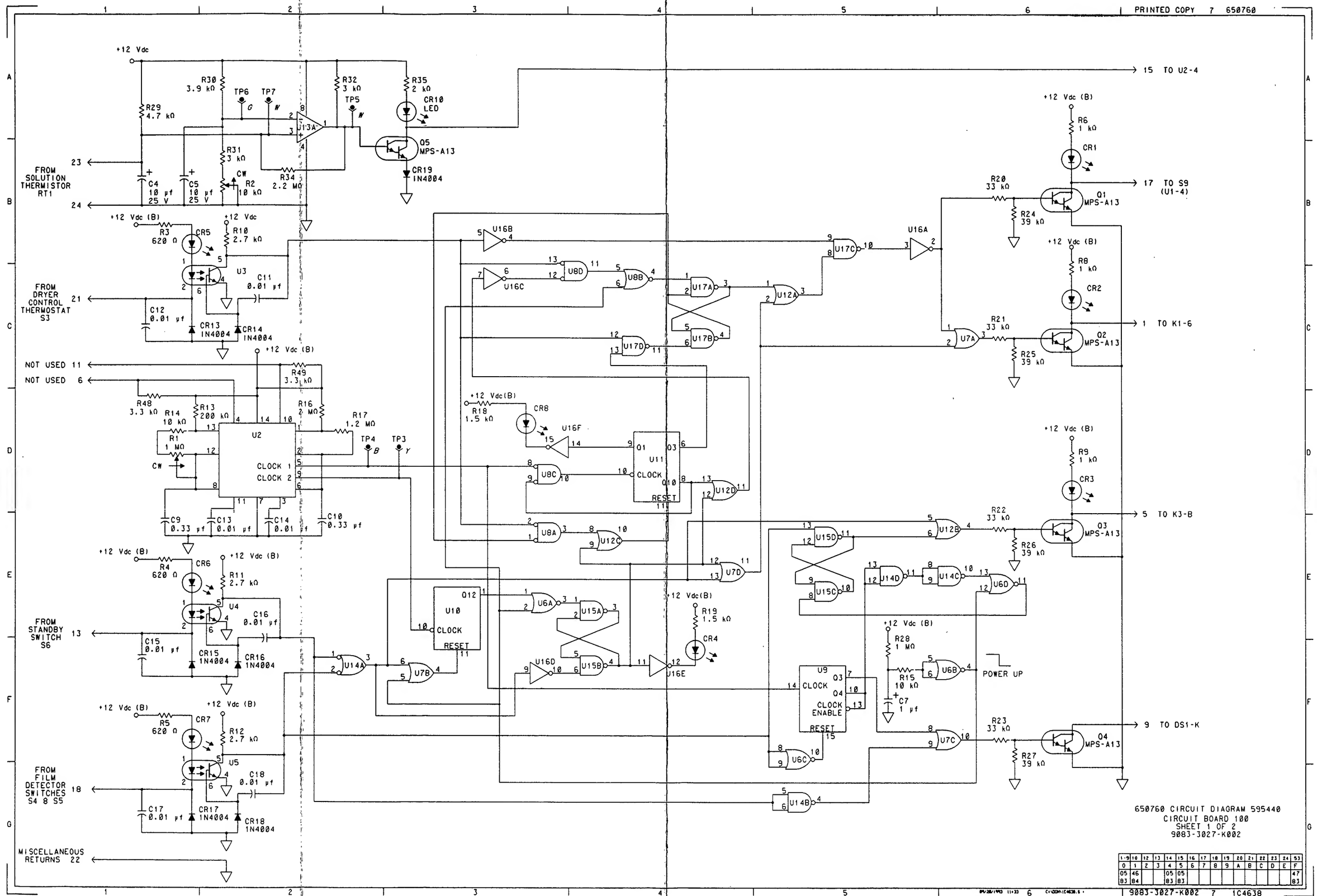


Figure 5-3 Circuit Diagram for the Complete M35-M Processor, Sheet 2 of 2 5-5



5–6 Figure 5-4 Circuit Diagram for the 100 Board in the M35-M or M35A-M Processor, Sheet 1 of 2

FROM ANODE TUBE 20
FROM SOLUTION OVERTEMPERATURE PROBE 16
19
CR20 1N4004
CR12 1N4004
+12 Vdc (A)
R38 100 kΩ
R39 100 kΩ
R42 18 kΩ
R40 100 kΩ
CR21 1N4004
R13 3 kΩ
R36 2 kΩ
CR11
TP9
TP10
TP8
6
5
7
U13B
Q6 MPS-A13
12 TO K2-B
R45 24 kΩ
R7 4.7 kΩ
C6 10 µf 25 V
R41 330 kΩ
R43 9.1 kΩ
R44 51kΩ
R46 5.6 Ω 1 W
+12 Vdc (A)
7 TO U1-3 & U2-3 (M35 & M35A J801-2)
C2 100 µf
C19 0.01 µf
8 +12 Vdc TO RELAYS
FROM TRANSFORMER 2
FROM TRANSFORMER 3
FROM TRANSFORMER 4
CR23 MR504
CR24 MR504
F1 1 A
U1
B
E
C
TP1 R
TP2 K
R47 5.6 Ω 1 W
+12 Vdc (B)
RV1 MOV V39ZA1
C1 1000 µf 35 V
C29 0.1 µf
C8 0.1 µf 25 V
R37 2 kΩ
CR9
C3 100 µf
C20 0.01 µf
10 NOT USED
14 TO EARTH GROUND
+12 Vdc (B)
C21 0.1 µf
C22 0.1 µf
C23 0.1 µf
C24 0.1 µf
C25 0.1 µf
C26 0.1 µf
C27 0.1 µf
C28 0.1 µf

DESIGINATOR	TYPE	V cc	RETURN
U1	LM340T-12	—	—
U2	NE556	14	7
U3,4,5	SOC-15	—	—
U6,8	CD4001	14	7
U7,12	CD4071	14	7
U9	CD4017	16	8
U10,11	CD4040	16	8
U13	LM393	8	4
U14,15,17	CD4011	14	7
U16	CD4049	1	8

650761 CIRCUIT DIAGRAM 595440
CIRCUIT BOARD 100
SHEET 2 OF 2
9083-3027-K003

1-9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0	1	2	3		4	5	6	7	8	9	A	B	C	D	E	F
05 83	35 86				05 83	05 83										47 83

9083-3027-K003 7 1C4638

Figure 5-4 Circuit Diagram for the 100 Board in the M35-M or M35A-M Processor, Sheet 2 of 2

WD - CONTROL BOX M35A-M - 779525

ELECTRICAL BOX

M1 THERMOMETER
CASE GRD
DRAIN R K
C

TB2
TB3
TB4

E2 E3 E4

TO R2
TO A1
TO A1

SPARE SPARE

DRYER TEMP. CONT. POT R2 & AY-RTD
DRYER HEATER, R1 & DRYER OT, S6 & GND
HEATER DEVELOPER R4
RECIRC PUMP CABLE
REPLEN-ISH PUMP, B4
DRIVE MOTOR, B1 POWER
BLOWER MOTOR, B2
AY-AUX BOX
DEVELOP-ER O.T., S7 & DEVELOP ER, RT1
WIRES DRYER CONT'L TO BOX
FILM DETECTOR SW'S S3 & S4 651859
INTER-LOCK SW, S5 & STAND BY SW, S2
DRIVE MOTOR, B1 TACH

J/P 1 CONNECTOR
RECIRC PUMP B3
RTD
DRYER OVERTEMP THERMOSTAT S6
DRYER HEATER, R1
500W
500W
J/P801 CONNECTOR
800 PCB DRYER TEMP CONTROL
J/P802 CONNECTOR
E6
E7
FRAME
E9
E10
J/P2 TACH
J/P3 POWER
B1 DRIVE MOTOR
THERMOWELL
DEVELOPER HEATER R4
SOLUTION OVERTEMP S7
DEVELOPER THERMISTOR RT1

B3 R1 S6
B4
B2
S4
FEED TRAY
RTD
800 PCB
B1
S3
S2
R4 O.T. S7 RT1
CB3 J9 L1 J8
R2
CB3 ELECTRICAL BOX
MODE SW
S5

AX. BOX
J/P10
CB3 1 AMP
J9 SAFELITE RECEPT.
HOT
NEUT
GND
L1 MODELITE
J8 INTRAPACE JACK
T
R
SLV

* PART OF THE ELECTRIC BOX ASSY

COLOR CODE

K-BLACK -0	G-GREEN -5
N-BROWN -1	B-BLUE -6
R-RED -2	V-VIOLET-7
O-ORANGE-3	A-GRAY -8
Y-YELLOW-4	W-WHITE -9

TO INTERPRET WIRE COLOR CODE, LOCATE EXTRA WIDE WHITE SPACE. ADJACENT NARROW COLOR BAND REPRESENTS FIRST (HUNDREDS) DIGIT IN CIRCUIT NUMBER. MEDIUM WIDTH BAND, SECOND (TENS) DIGIT; WIDEST BAND, THIRD (UNITS) DIGIT.

WIRING DIAGRAM M35A-M COMPLETE SHEET 1 OF 1

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5-8 **Figure 5-5 Wiring Diagram for the Complete M35A-M Processor**

WD - CONTROL BOX M35-M

ELECTRICAL BOX

M1 THERMOMETER

CASE GRD

DRAIN R K

TB2 TB3 TB4

TO R2

TO CB1

TO A1

E2 E3 E4 E6 E7 E9 E10

DRYER TEMP.CONT. POT R2 & AY-RTD

EMI FILTER

LOAD SIDE LINE SIDE

DRYER HEATER,R1 & DRYER OT,S6 & GND

HEATER DEVELOPER R4

RECIRC PUMP CABLE

REPLEN-ISH PUMP, B4

DRIVE MOTOR, B1 POWER

BLOWER MOTOR, B2

AY-AUX BOX

DEVELOP-ER O.T.,S7 & DEVELOP-ER,RT1

WIRES DRYER CONT'L TO BOX

FILM DETECTOR SW'S S3 & S4

INTER-LOCK SW.S5 & STAND-BY SW.S2

DRIVE MOTOR,B1 TACH

J/P 1 CONNECTOR

J/P801 CONNECTOR

J/P802 CONNECTOR

RTD

RECIRC PUMP B3

DRYER OVERTEMP THERMOSTAT S6

DRYER HEATER, R1

1000W

500W

800 PCB DRYER TEMP CONTROL

DEVELOPER HEATER R4

SOLUTION OVERTEMP S7

THERMOWELL

DEVELOPER THERMISTOR RT1

J/P2 TACH

J/P3 POWER

B1 DRIVE MOTOR

DRAIN K R

GY

FRAME

* PART OF THE ELECTRIC BOX ASSY

800 PCB

CB2 ELECTRICAL BOX

MODE SW (200 PCB)

S6 S4 S3 S2 S5

B3 B4 B2 B1 R1 R2 RTD

R4 O.T. S7 RT1

FEED TRAY

L1 J8

AUX. BOX

J/P10

L1 MODELITE

J8 INTRAPACE JACK

E10

COLOR CODE

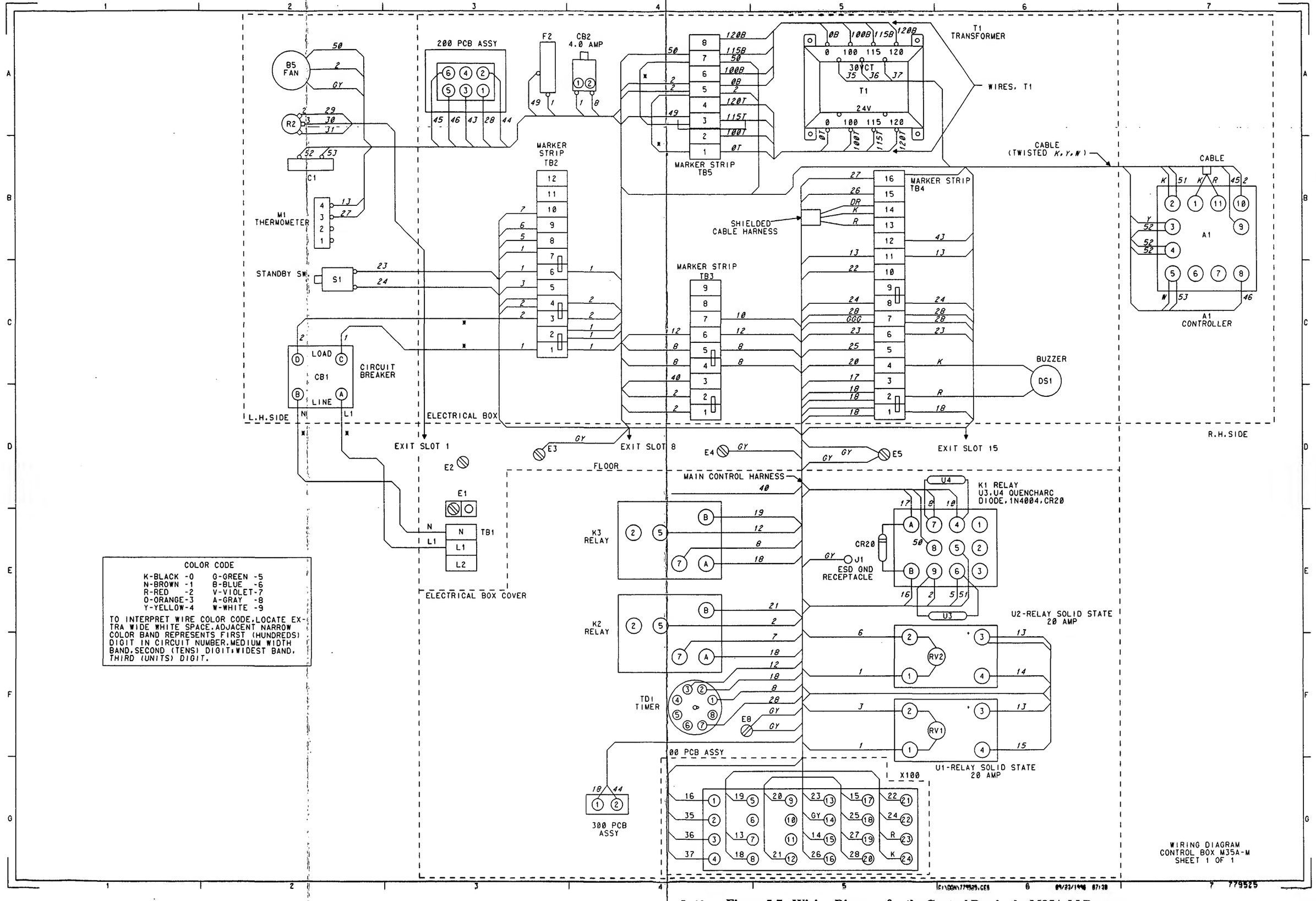
K-BLACK -0	G-GREEN -5
N-BROWN -1	B-BLUE -6
R-RED -2	V-VIOLET-7
O-ORANGE-3	A-GRAY -8
Y-YELLOW-4	W-WHITE -9

TO INTERPRET WIRE COLOR CODE, LOCATE EXTRA WIDE WHITE SPACE. ADJACENT NARROW COLOR BAND REPRESENTS FIRST (HUNDREDS) DIGIT IN CIRCUIT NUMBER. MEDIUM WIDTH BAND, SECOND (TENS) DIGIT; WIDEST BAND, THIRD (UNITS) DIGIT.

WIRING DIAGRAM M35-M COMPLETE SHEET 1 OF 1

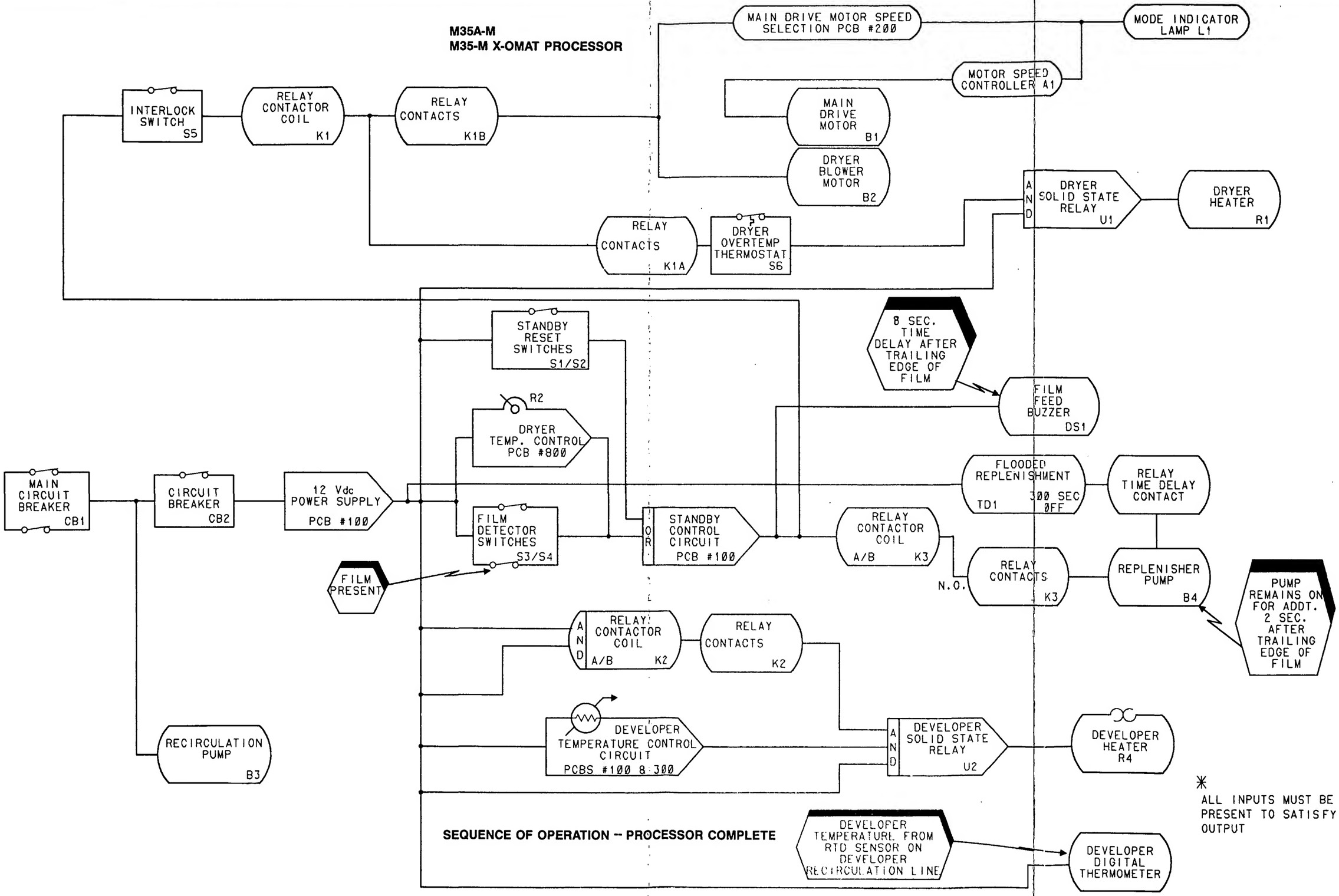
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Figure 5-6 Wiring Diagram for the Complete M35-M Processor



5–10 Figure 5-7 Wiring Diagram for the Control Box in the M35A-M Processor

M35A-M
M35-M X-OMAT PROCESSOR



* ALL INPUTS MUST BE PRESENT TO SATISFY OUTPUT

SEQUENCE OF OPERATION -- PROCESSOR COMPLETE

Figure 5-8 Sequence of Operation for the Complete M35-M or M35A-M Processor

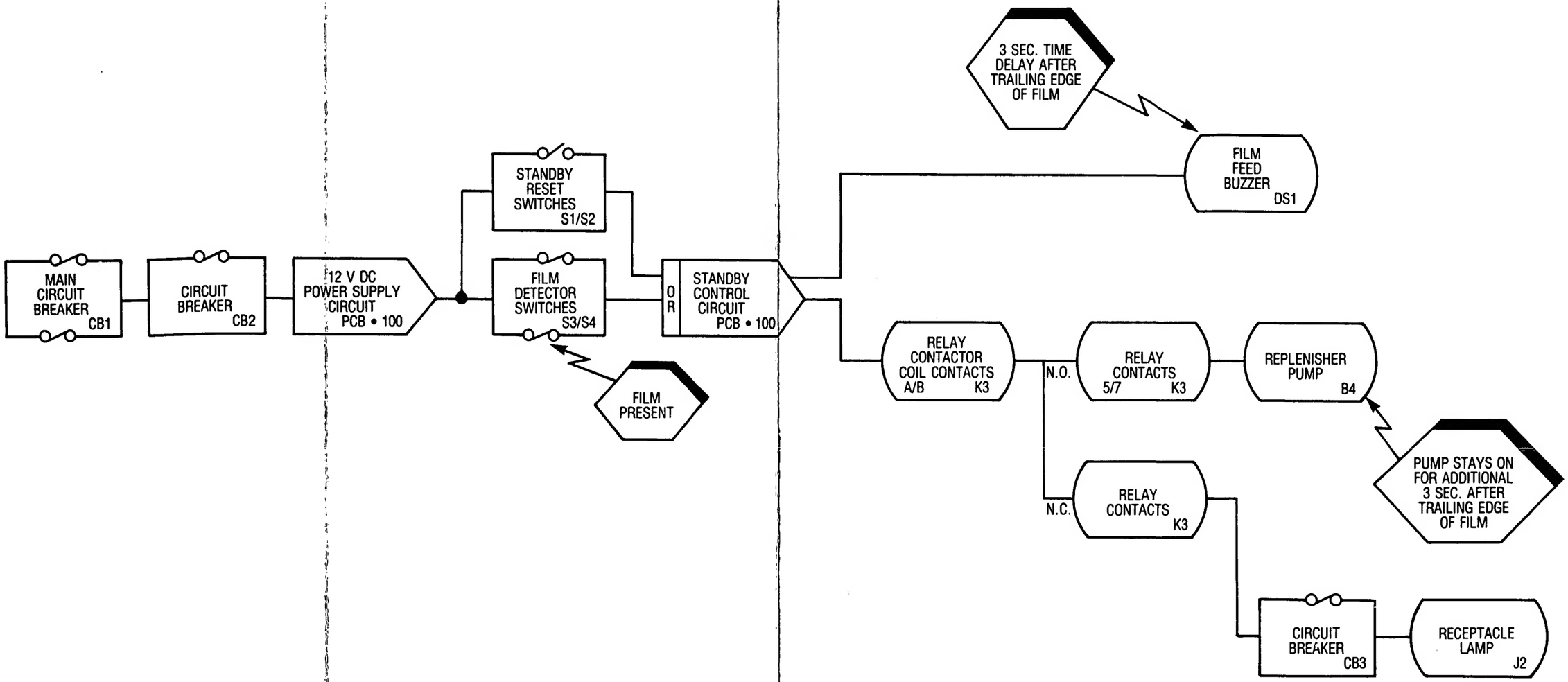
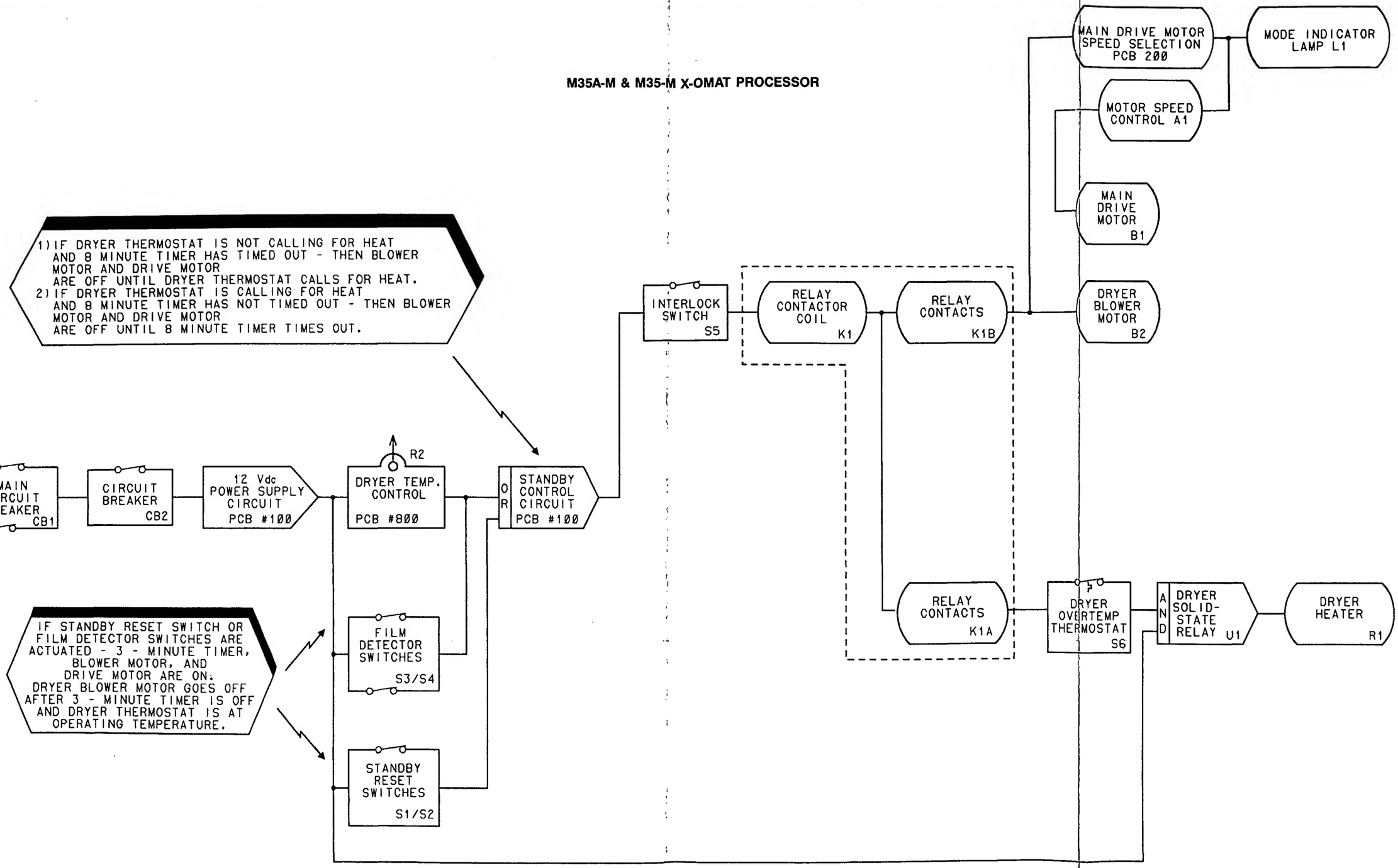
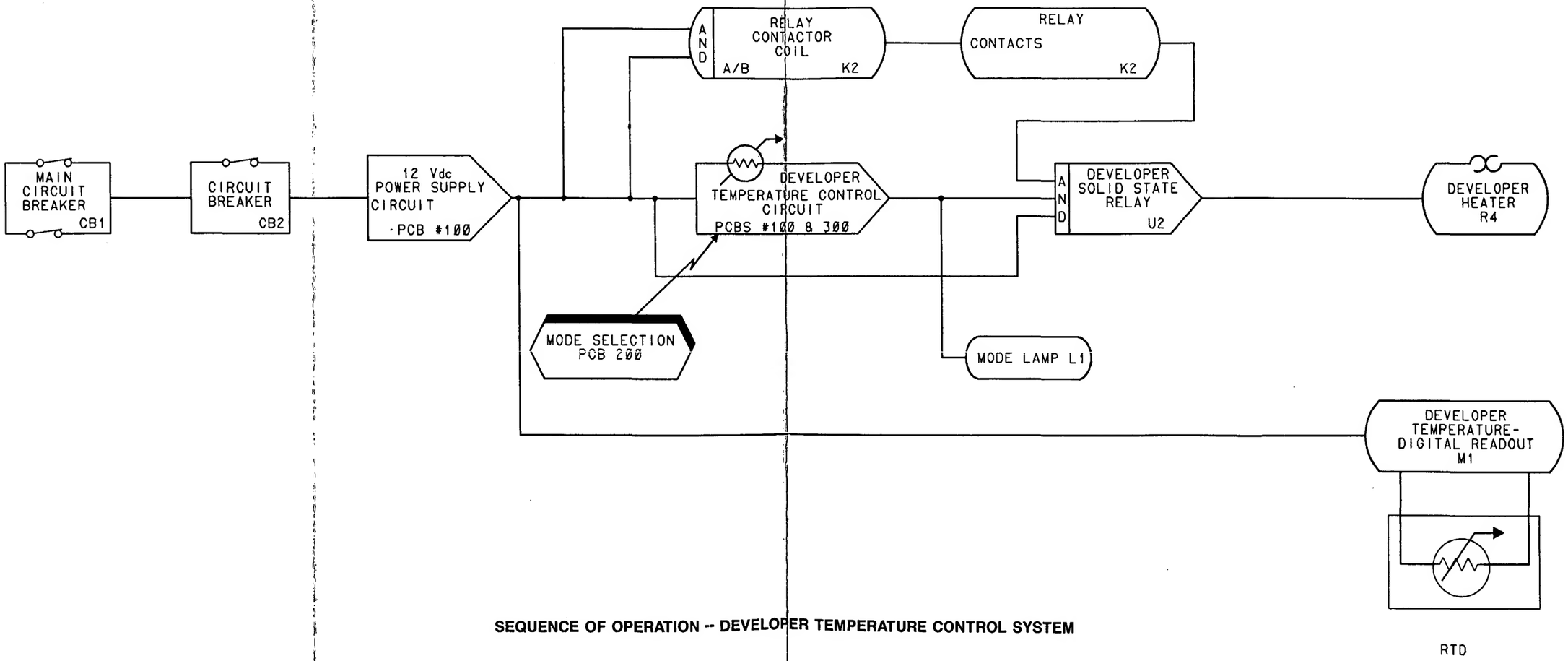


Figure 5-9 Sequence of Operation — Film Feeding — for the M35-M and M35A-M Processors



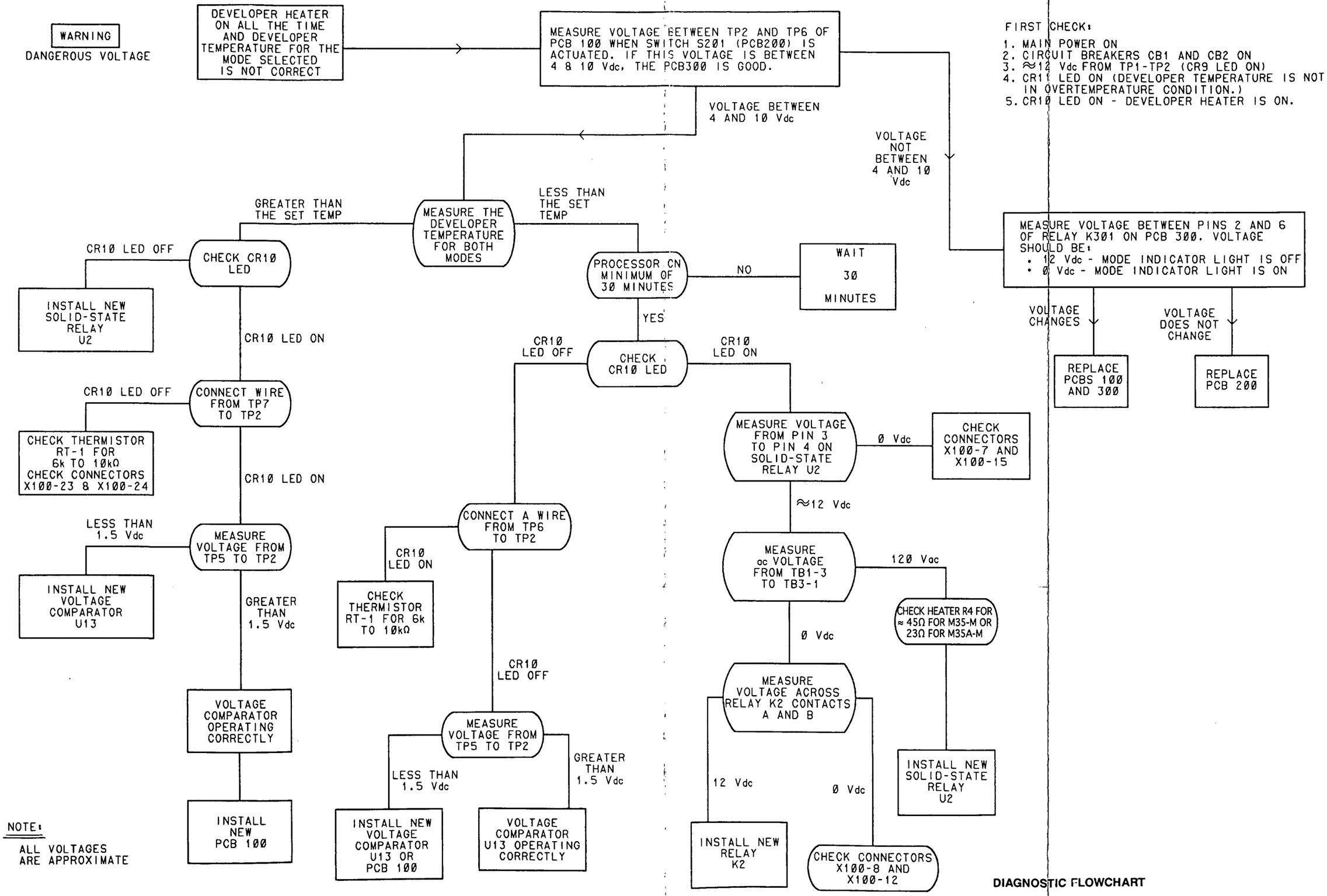
SEQUENCE OF OPERATION - DRYER TEMPERATURE CONTROL SYSTEM AND MAIN DRIVE MOTOR

Figure 5-10 Sequence of Operation — Dryer Temperature Control System and Main Drive Motor — for the M35-M and M35A-M Processors



SEQUENCE OF OPERATION -- DEVELOPER TEMPERATURE CONTROL SYSTEM

Figure 5-11 Sequence of Operation — Developer Temperature Control System — for the M35-M and M35A-M Processors



DIAGNOSTIC FLOWCHART

Figure 5-12 Diagnostic Flowchart for the Complete M35-M or M35A-M Processor

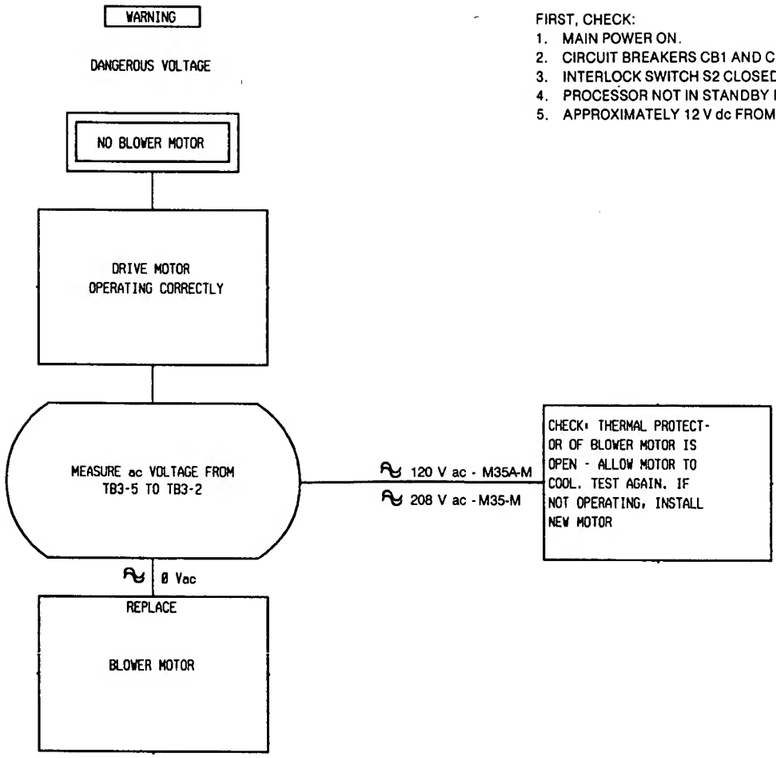


Figure 5-13 Diagnostic Flowchart for a Processor with a Malfunctioning Blower Motor — for the M35-M and M35A-M Processors

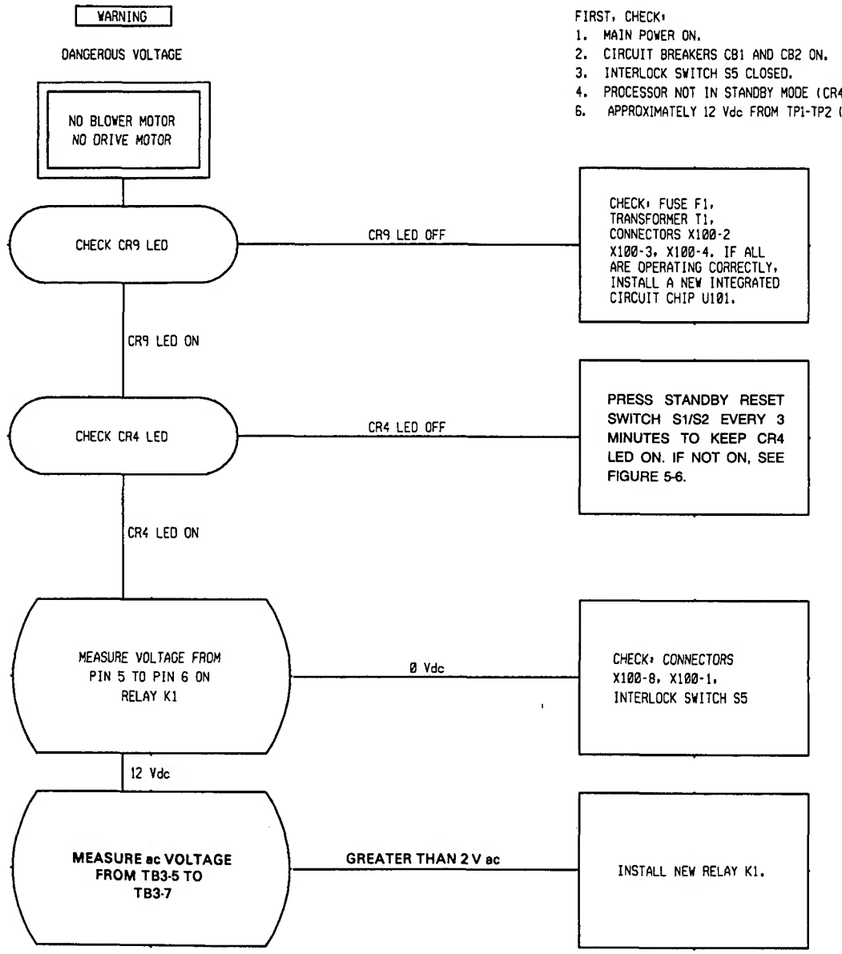
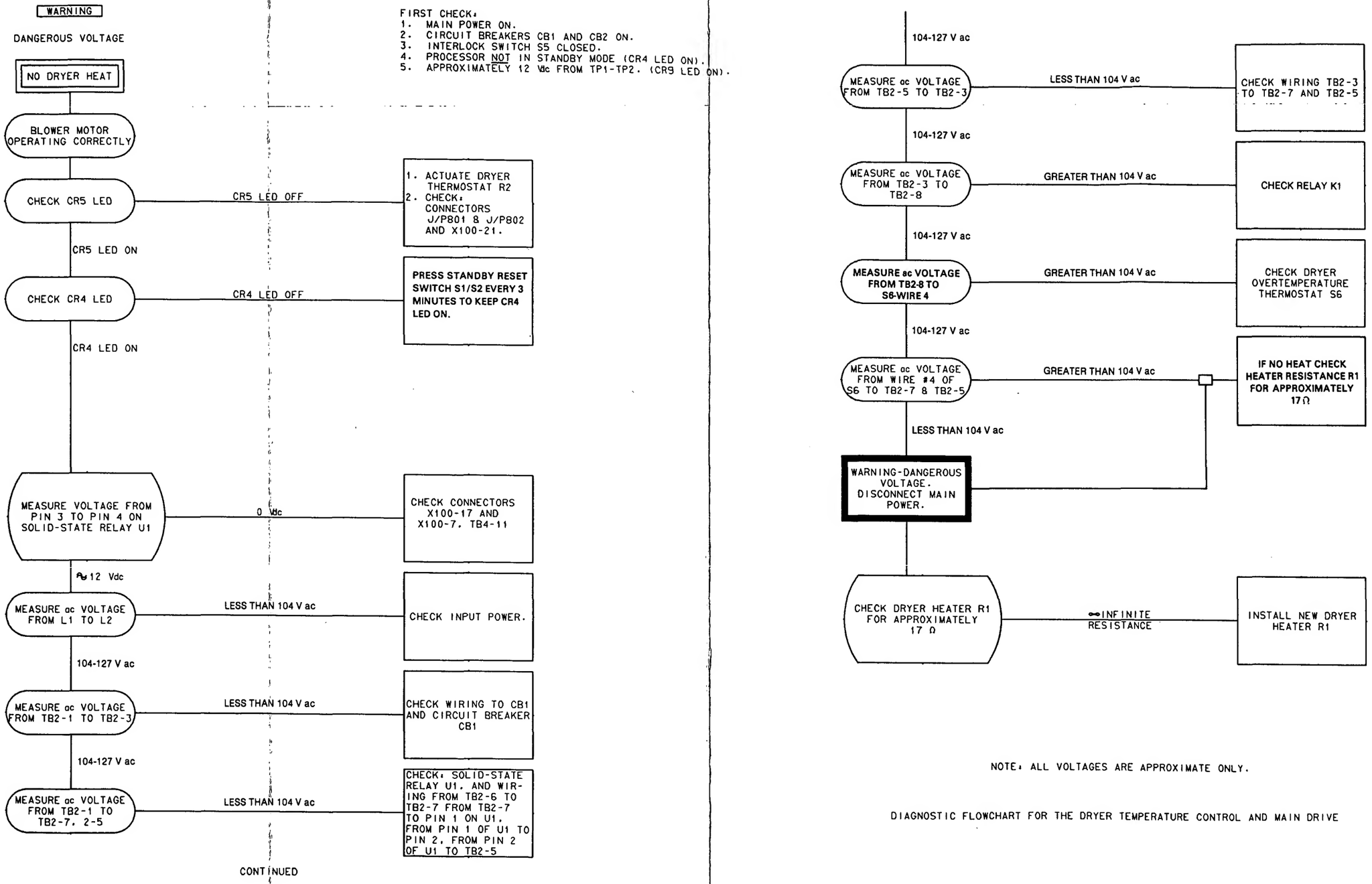


Figure 5-14 Diagnostic Flowchart for a Processor with Malfunctioning Blower Motor or Drive Motor — for the M35-M and M35A-M Processors



NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

DIAGNOSTIC FLOWCHART FOR THE DRYER TEMPERATURE CONTROL AND MAIN DRIVE

Figure 5-15 Diagnostic Flowchart for a Processor without Heat in the Dryer — for the M35A-M Processor

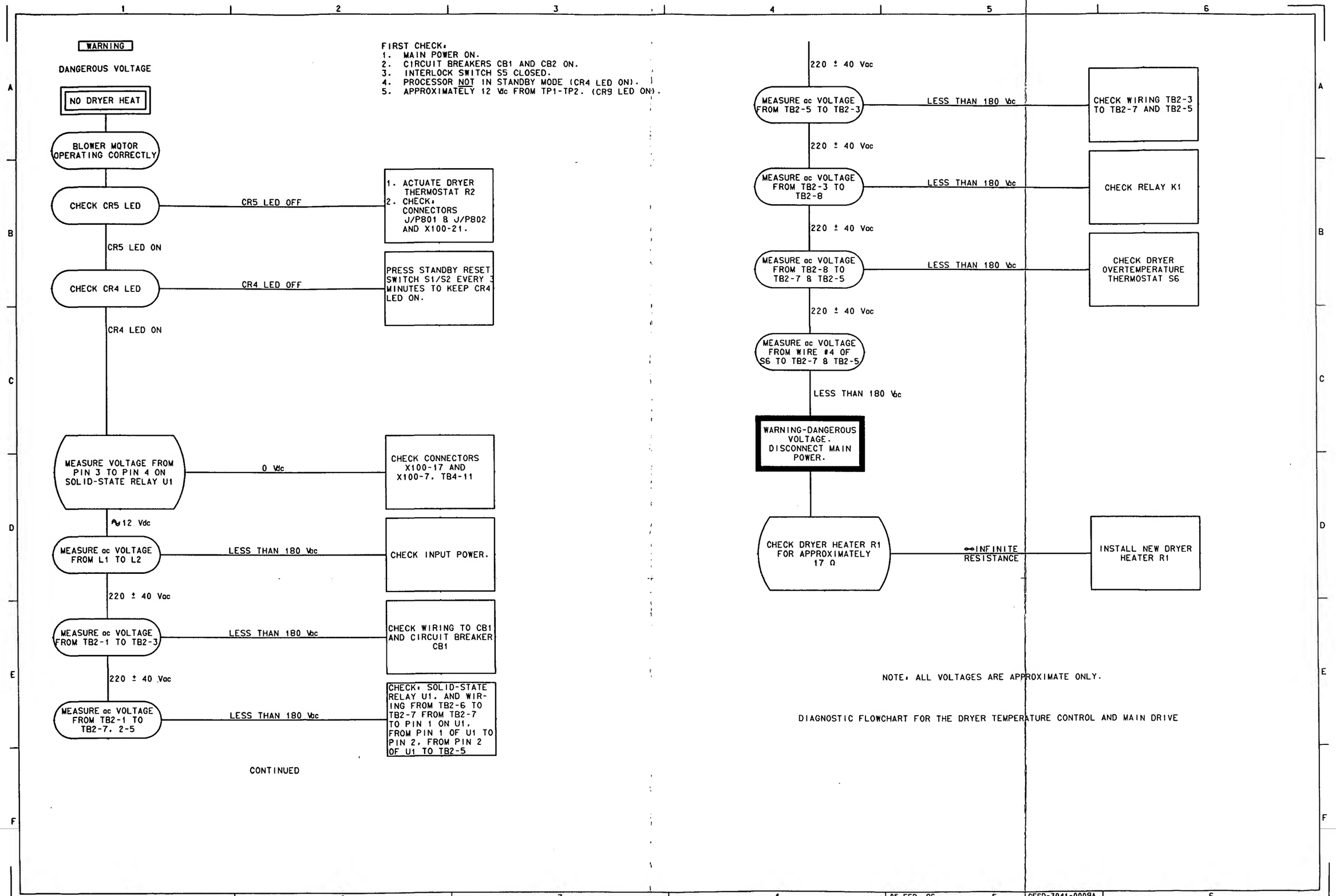
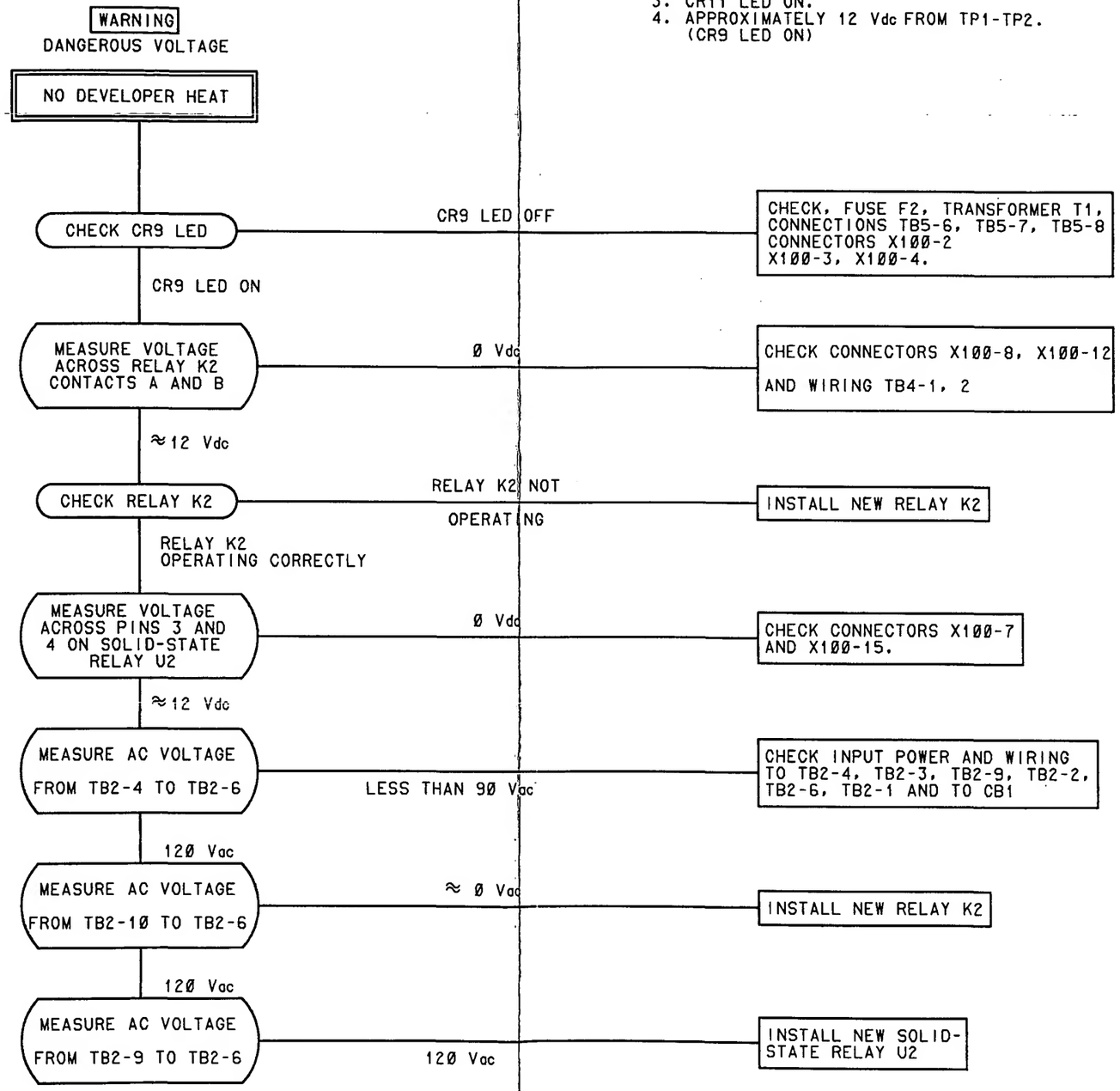


Figure 5-16 Diagnostic Flowchart for a Processor without Heat in the Dryer — for the M35-M Processor



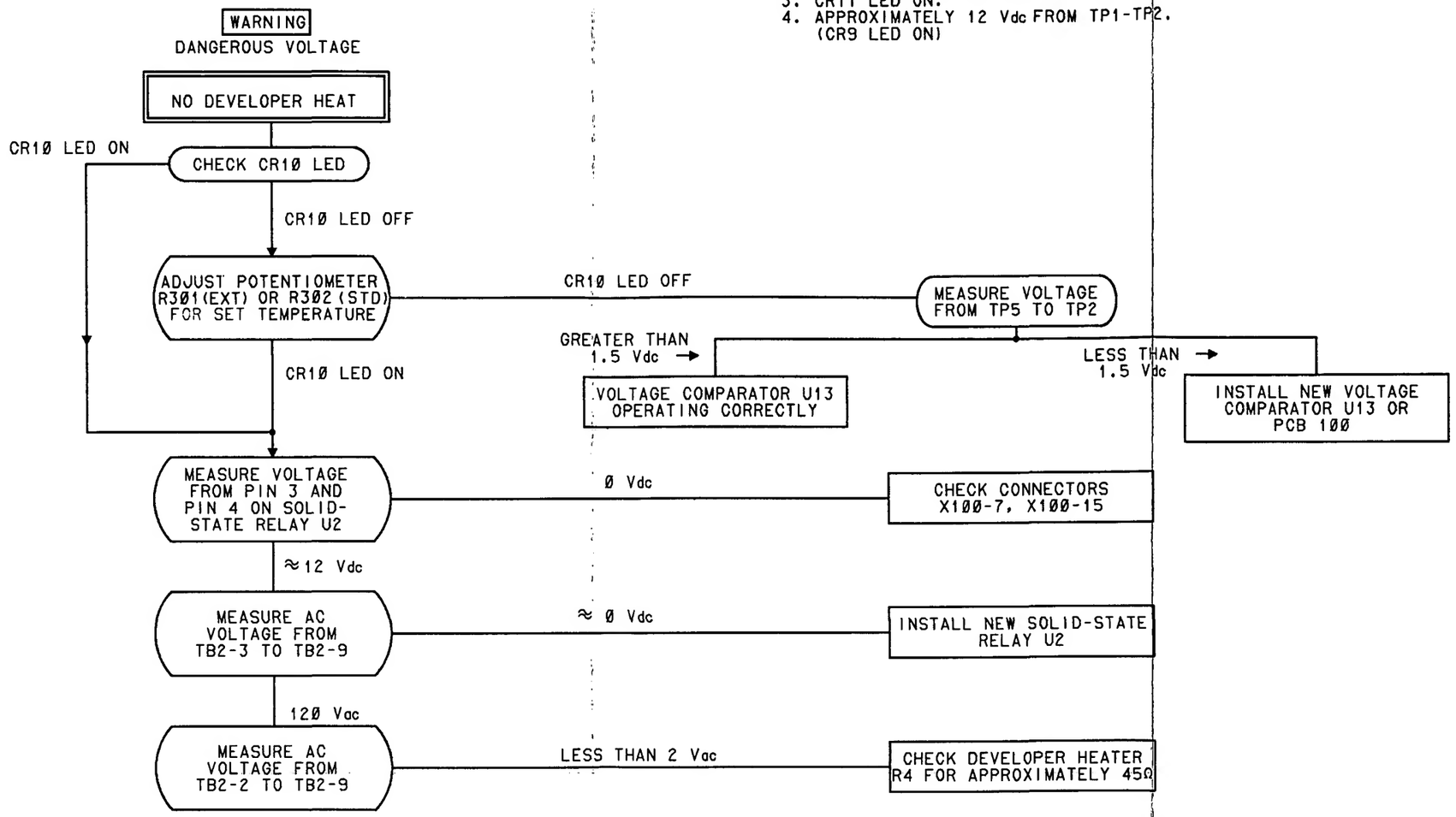
DIAGNOSTIC FLOWCHART MALFUNCTIONING DEVELOPER TEMPERATURE CONTROL

NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

Figure 5-17 Diagnostic Flowchart for a Processor with a Malfunctioning Developer Temperature Control System — for the M35A-M Processor only, Sheet 1 of 2

M35A-M X-OMAT PROCESSOR ONLY

FIRST CHECK:
1. MAIN POWER ON
2. CIRCUIT BREAKERS CB1 AND CB2 ON.
3. CR11 LED ON.
4. APPROXIMATELY 12 Vdc FROM TP1-TP2. (CR9 LED ON)

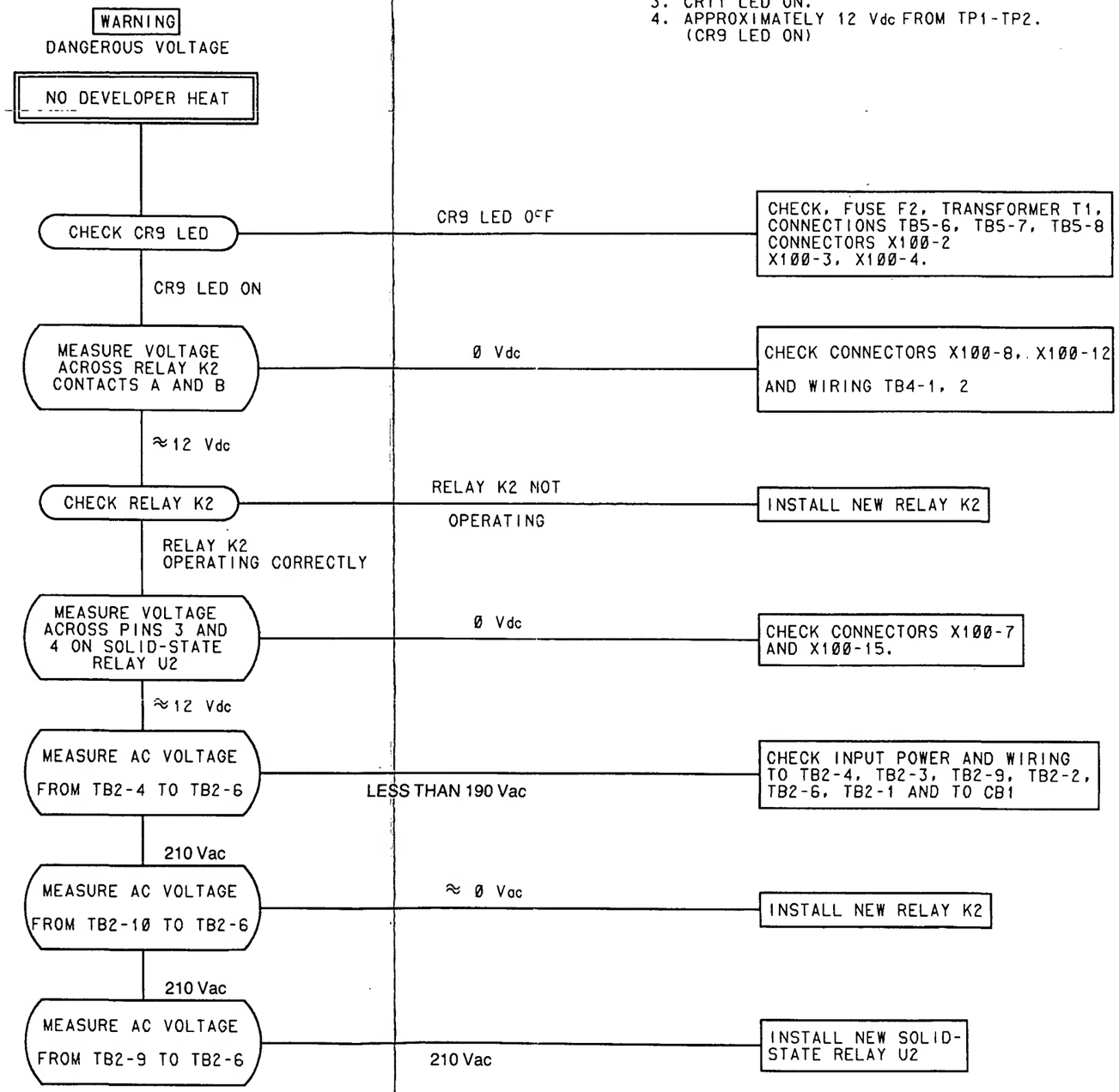


NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

DIAGNOSTIC FLOWCHART MALFUNCTIONING DEVELOPER TEMPERATURE CONTROL

Figure 5-17 Diagnostic Flowchart for a Processor with a Malfunctioning Developer Temperature Control System — for the M35A-M Processor only, Sheet 2 of 2

M35-M X-OMAT PROCESSOR ONLY

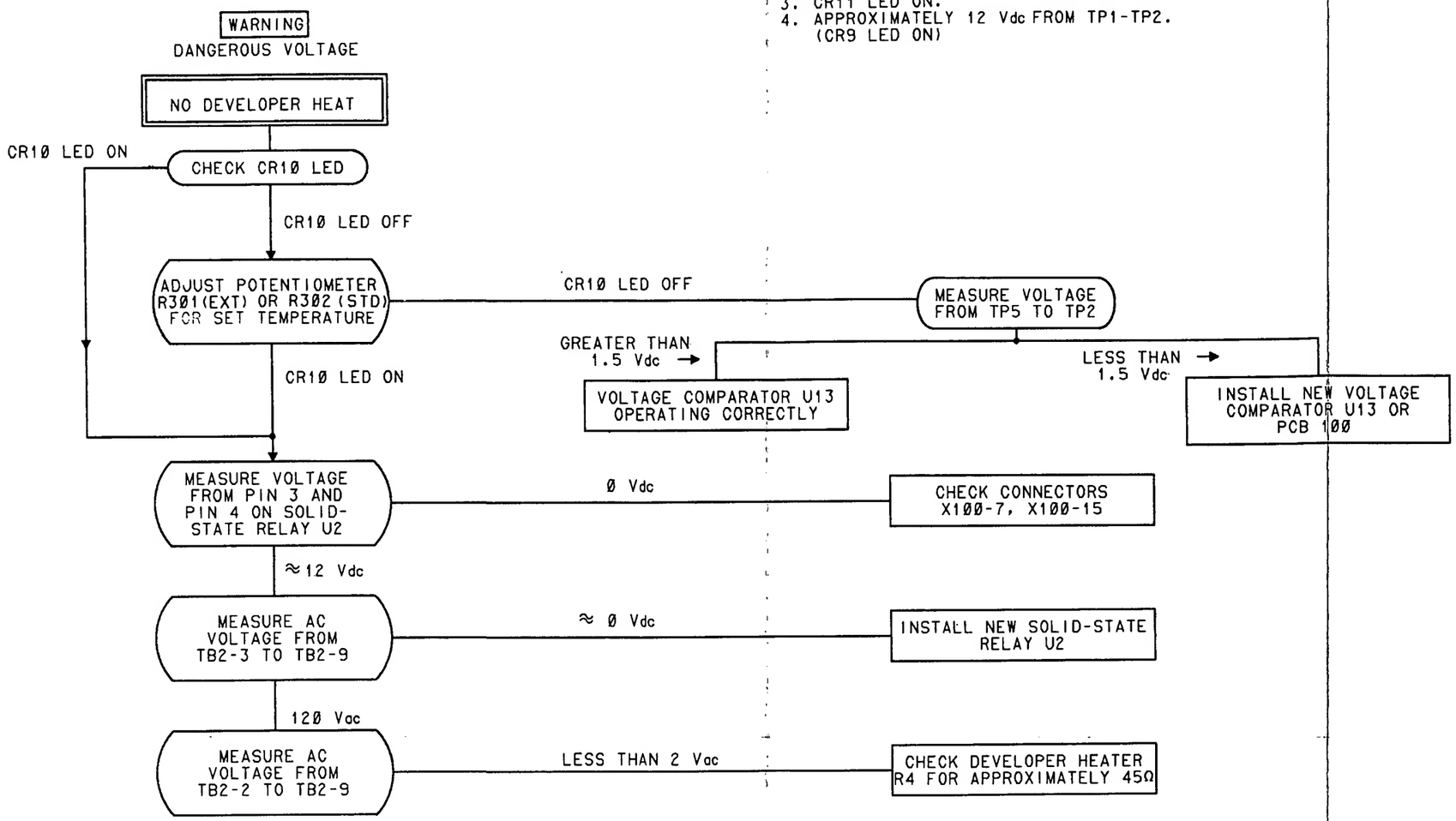


NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

DIAGNOSTIC FLOWCHART FOR A PROCESSOR WITH A MALFUNCTIONING DEVELOPER TEMPERATURE CONTROL SYSTEM

Figure 5-18 Diagnostic Flowchart for a Processor with a Malfunctioning Developer Temperature Control System — for the M35-M Processor only, Sheet 1 of 2

M35-M X-OMAT PROCESSOR ONLY



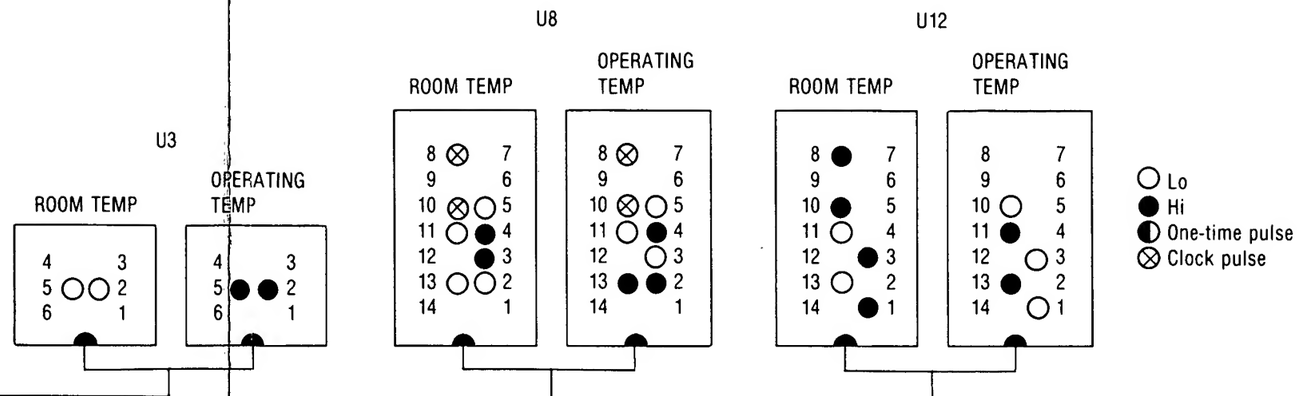
DIAGNOSTIC FLOWCHART FOR A PROCESSOR WITH A MALFUNCTIONING DEVELOPER TEMPERATURE CONTROL SYSTEM

NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

Figure 5-18 Diagnostic Flowchart for a Processor with a Malfunctioning Developer Temperature Control System — for the M35-M Processor only, Sheet 2 of 2

FIRST, CHECK:

1. At "ROOM TEMPERATURE": CR2 LED ON
   CR4 LED OFF
   CR8 LED OFF
2. At "OPERATING TEMPERATURE": CR2 LED OFF
   CR4 LED OFF
   CR8 LED OFF
3. FILM DETECTOR SWITCHES S3 and/or S4 Actuated Open.
4. INTERLOCK SWITCH S2 Actuated Closed.



See FIGURE 3-2 if CR9 LED is Off.

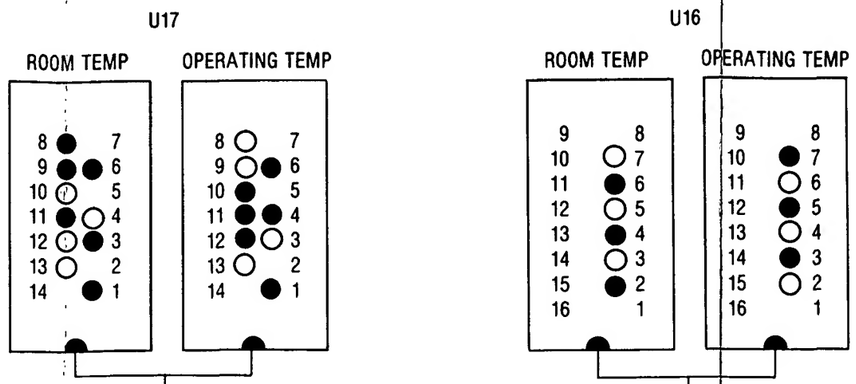
DRYER TEMPERATURE	POWER SUPPLY CIRCUIT		U3		CR5 LED	DRYER THERMOSTAT S3	U8							CR8 & CR4 LEDS	U12					
	+ − TP1—TP2	CR9 LED	PIN 2	PIN 5			PIN 13	PIN 11	PIN 8 PIN 10	PIN 5	PIN 4	PIN 3	PIN 2		PIN 1	PIN 3	PIN 8	PIN 10	PIN 11	PIN 13
ROOM TEMPERATURE	12 V dc	ON	Lo	Lo	ON	ENERGIZED	Lo	Lo	1-second clock pulses	Lo	Hi	Hi	Lo	OFF	Hi	Hi	Hi	Hi	Lo	Lo
OPERATING TEMPERATURE	12 V dc	ON	Hi	Hi	OFF	NOT ENERGIZED	Hi	Lo		Lo	Hi	Lo	Hi	OFF	Lo	Lo	Lo	Lo	Hi	Hi

See note 3.

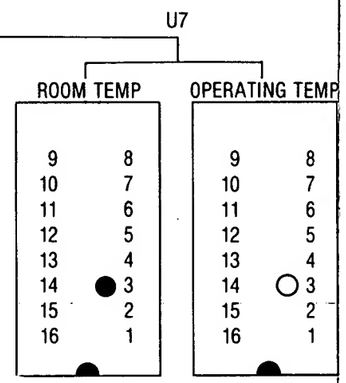
NOTES:

1. Voltages measured with respect to TP2 unless otherwise noted.
2. Voltages measured by a multimeter with an input impedance of 20,000 ohms per volt dc or more.
3. Goes Hi after 8-minute timer times out (CR8 LED is off).
4. Lo = Less than 1V dc
   Hi = Greater than 10V dc

Figure 5-19 Circuit Board Flowchart for the Dryer Temperature Control System and the Main Drive — for the M35A-M Processor, Sheet 1 of 2



DRYER TEMPERATURE	U17										U16					
	PIN 13	PIN 12	PIN 11	PIN 10	PIN 9	PIN 8	PIN 6	PIN 4	PIN 3	PIN 1	PIN 7	PIN 6	PIN 5	PIN 4	PIN 3	PIN 2
ROOM TEMPERATURE	Lo	Lo	Hi	Lo	Hi	Hi	Hi	Lo	Hi	Hi	Lo	Hi	Lo	Hi	Lo	Hi
OPERATING TEMPERATURE	Lo	Hi	Hi	Hi	Lo	Lo	Hi	Hi	Lo	Hi	Hi	Lo	Hi	Lo	Hi	Lo



NO BLOWER MOTOR, NO DRIVE MOTOR	U7 PIN 3	CR2 LED	TRANSISTOR Q2	RELAY K1 CONTACTS 3	RELAY K1 CONTACTS 7	RELAY K1 CONTACTOR COIL 5	RELAY K1 CONTACTOR COIL 6	BLOWER MOTOR B2	DRIVE MOTOR B1
ROOM TEMPERATURE	Hi	ON	ON	0 V ac	0 V ac	ENERGIZED		ON	ON
OPERATING TEMPERATURE	Lo	OFF	OFF	120 V	120 V	NOT ENERGIZED		OFF	OFF

NO DRYER HEATER	CR5 and CR1 LEDS	TRANSISTOR Q1	SOLID-STATE RELAY U1 PIN 4	SOLID-STATE RELAY U1 PIN 3	SOLID-STATE RELAY U1	RELAY K1 CONTACTS 4	RELAY K1 CONTACTS 8	DRYER HEATER R1
ROOM TEMPERATURE	ON	ON	0 V dc	12 V dc	ENERGIZED	ENERGIZED		ON
OPERATING TEMPERATURE	OFF	OFF	12 V dc	12 V dc	NOT ENERGIZED	ENERGIZED		OFF

CONDITION	SEE FIGURE
No Blower Motor, No Drive Motor	5-14
No Dryer Heater	5-15
No Blower Motor	5-13

Figure 5-19 Circuit Board Flowchart for the Dryer Temperature Control System and the Main Drive — for the M35A-M Processor, Sheet 2 of 2

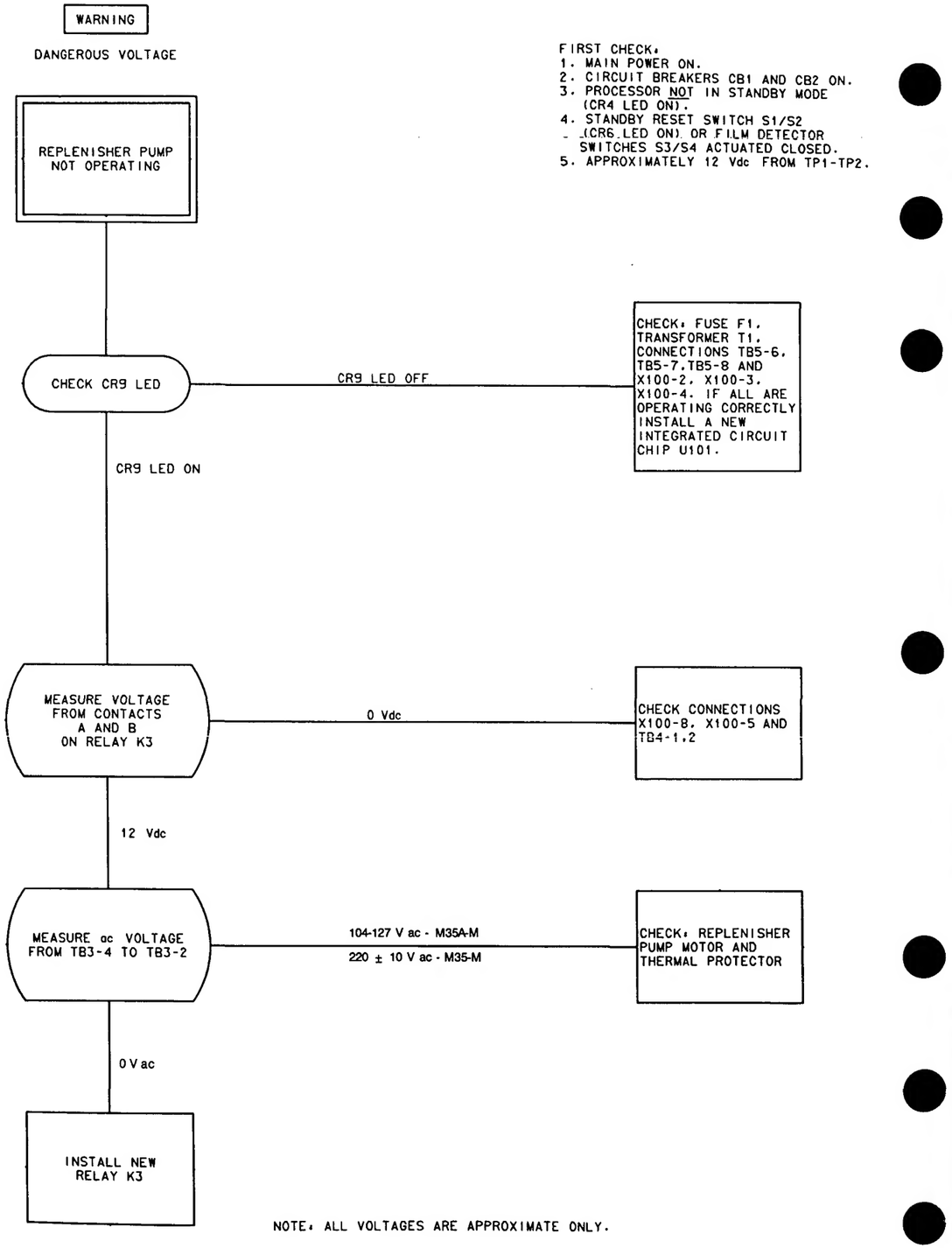


Figure 5-20 Diagnostic Flowchart for Replenishment Control System — for the M35-M and M35A-M Processors

Section 6: Publication History

Print Date	Pub. No.	Affected Pages	File Name	Notes
Sept 1992	981901	All	3133sm_a.txt	Original Printing in CAPS. Called PCN 1, it combined the M35-M and M35A-M Service Manuals into one publication. and updated the information.
Sept 1996	981901	All	sm3133_1_a.doc (m35sm.1 through .6)	Revised to reflect the new size Feed Shelf, update Part numbers and the Circuit Diagrams and the replenishment flow rate table, and add warnings on drain construction. Converted to FrameBuilder.

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